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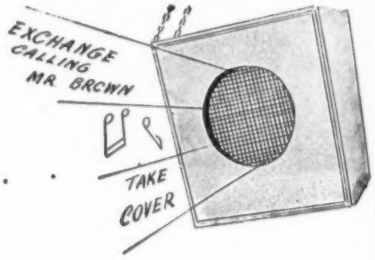

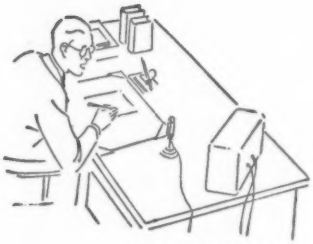

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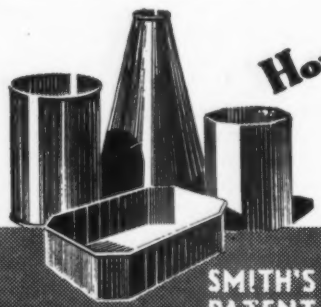

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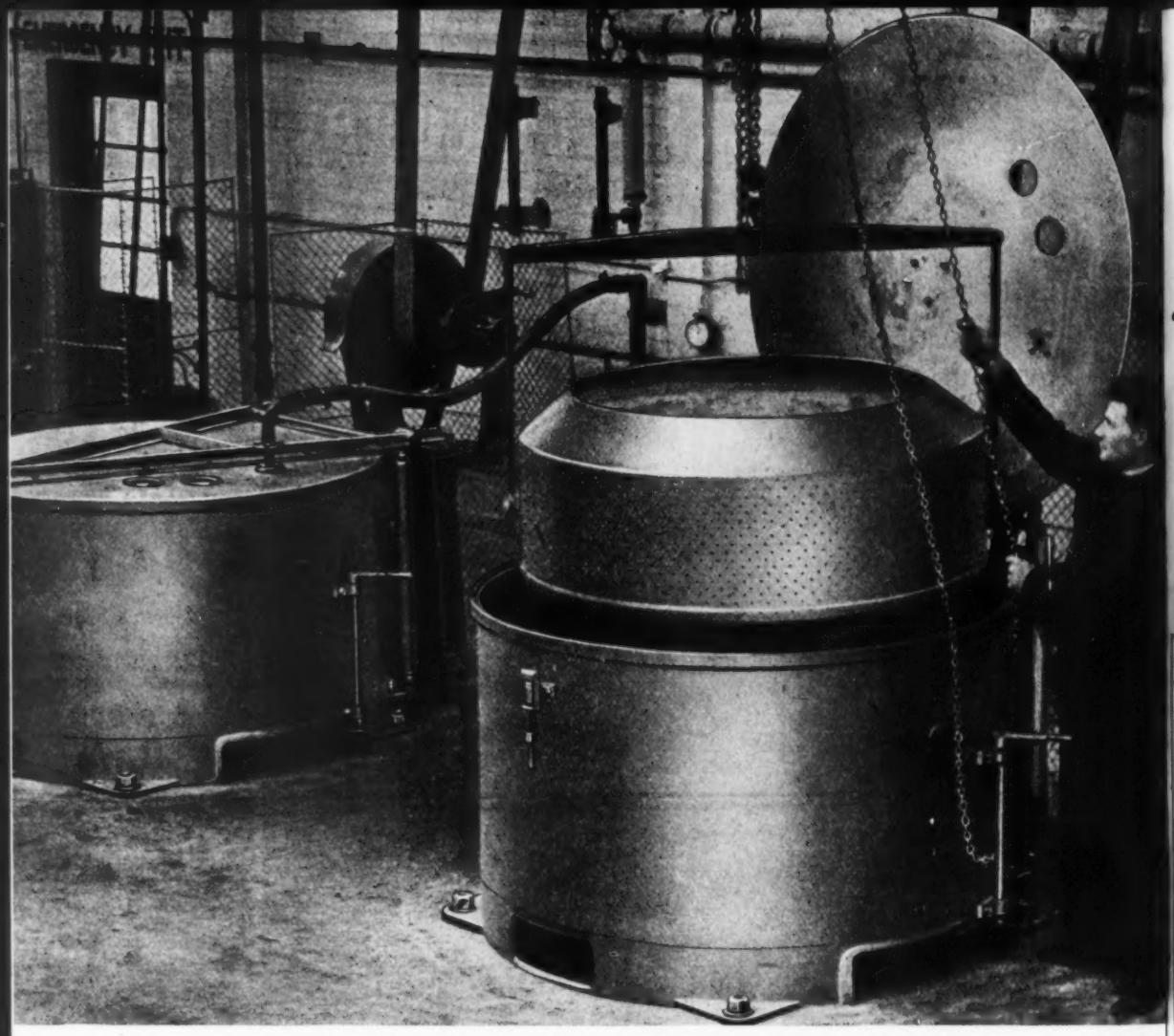

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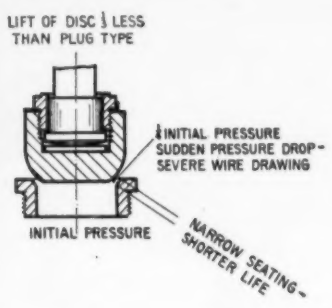

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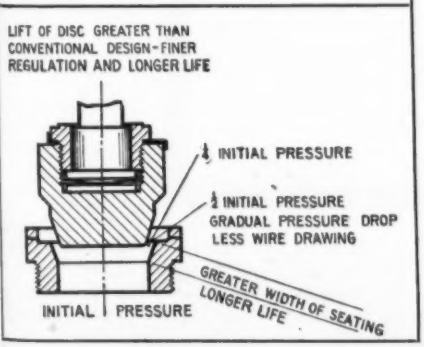

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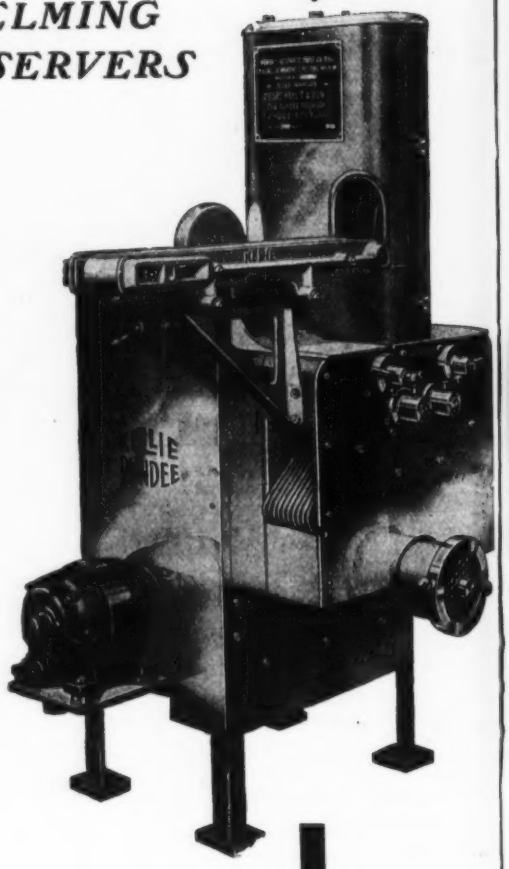

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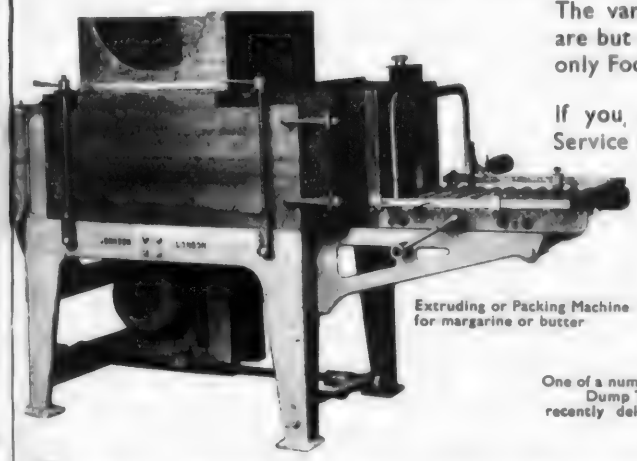

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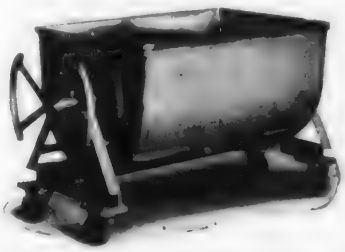

One of a number of Dump Trucks recently delivered

A. JOHNSON & CO. (LONDON) LTD.

AFRICA HOUSE, KINGSWAY, LONDON, W.C.2 Works: DUKE'S RD., ACTON, W.3

Coffee Percolators: part of an order for a well-known firm

Solve your internal conveying problems with SPECIALISED METAL VEHICLES

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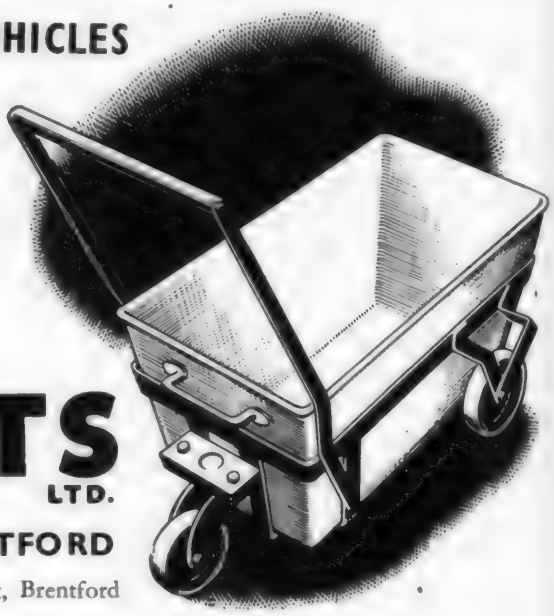
METAL . . . . *for durability*
VEHICLES . . . *for mobility*



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GREAT WEST ROAD, BRENTFORD

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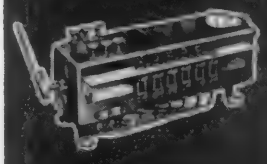
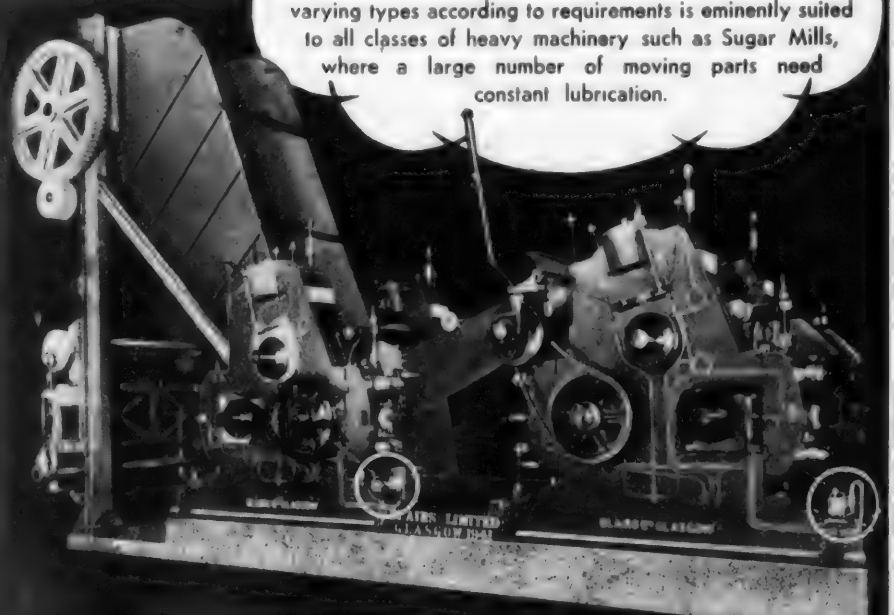
TECALEMIT MECHANICAL LUBRICATION

Tecalemit automatic mechanical lubricating equipment of varying types according to requirements is eminently suited to all classes of heavy machinery such as Sugar Mills, where a large number of moving parts need constant lubrication.



An illustration of one of the three Tecalemit "Brentford" Lubricators, Model BGR.66, with "flow indicators" fitted by Messrs. Blairs Ltd. Glasgow, to their Sugar Milling Plants shown herewith.



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CHIEFTAIN YEASTS

for all purposes, including

DRIED YEAST

specially prepared and packed for use in emergency.

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The "Chieftain" Trade Mark stands for Quality, Reliability and an efficient Nation-wide distribution service.

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FOR CONCENTRATING MILK, GELATINE, PECTIN, SYRUPS, FRUIT JUICES AND HEAT-SENSITIVE LIQUIDS

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Standard equipment with capacities of 1 gallon to 10,000 gallons per hour.

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That is something *you* control. Watch your loading and unloading. Cut ten minutes out of each hour of standstill time. That's what the nation asks of you—what it *needs* from you.

You know your own problems best. Tackle them in your own way But tackle them now. Plan, encourage ideas, improvise if needs be. Here's a starting-off agenda:

1. CHECK OFFICE ARRANGEMENTS
2. LABOUR-SAVING EQUIPMENT
3. BLACK-OUT WORKING
4. OPINIONS OF "MEN WHO DO THE WORK"

WE MUST GET AN EVEN QUICKER TURNROUND

Ministry of War Transport

For 60 Years Pioneer Caramel Specialists

AMERICA FOR SKYSCRAPERS

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LAMBERTS *for* CARAMEL

THE lofty buildings that give grandeur to New York's skyline are symbolic to many of the brave New World. Similarly, the name Lamberts always calls to mind the achievements of over 60 years in the manufacture of highest quality Caramel.

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FOR ALL TYPES OF FOOD PACKING BY HAND OR MACHINE
SAMPLES OR ADVICE WILLINGLY SENT ON APPLICATION

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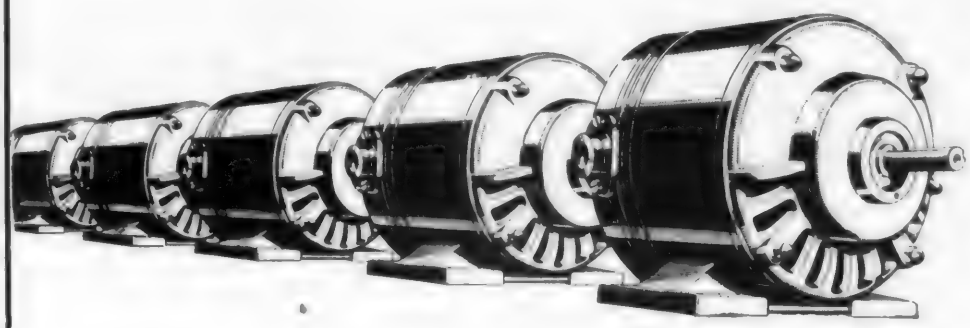

Power to Spare

Crompton "Minor" Motors are always capable of that "little more" when it is needed. It is because they are given that "little more" in manufacture.

CROMPTON PARKINSON
Limited

We herewith send Greetings and Best Wishes

Elpex

APPLE PECTIN

for the New Year to all users of "ELPEX," thanking them for their continued support, and look forward to more normal times when the difficulties of manufacture and supply will have lessened, enabling us to supply the "ELPEX" which all users so value in the quantities they wish, and with our normal promptness.

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FOR FOOD FACTORIES

Everything
Electrical
FOR POWER
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with complete assurance of efficient and economical operation.

Two grinders and a small blender driven by G.E.C. motors—15 h.p., 6 h.p. and 4½ h.p. respectively.

Two blenders 1-ton and 1½ tons capacity, driven by 5 h.p. (450 r.p.m.) and 6 h.p. (970 r.p.m.) slip-ring motors respectively.

Two views in a well-known food factory where a large quantity of G.E.C. equipment is employed

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.

PACKAGING QUIZ

You pay on the Nail!

1. ***It is generally assumed that nails are used to strengthen and hold together packing cases; in what way is Seal-Less Strapping more effective?***

Elementary, my dear reader, elementary. Nails are only effective at the point at which they are inserted. Seal-less Strapping—those bands of high tensile steel—give an overall grip right around the case.

2. ***You say that "nails destroy cases—and Seal-Less Strapping preserves them." How so?***

Yes, nails destroy cases in two main ways. For instance; sometimes as many as fifty nails are driven into a lid to hold it down. This means the receiver has to draw most of them and hack and prize the case open before unpacking. Then, before the case is returned to the sender these nails are banged home again. When, in turn, the sender gets the case back his packer has once again to draw them and bang home fifty more when refilling. It's perfectly natural that bits of timber begin to fly off the case even after one journey. Then there is another way in which cases are destroyed by nails. When the cases get wet the nails rust, and in a very short space of time this rots away the timber. We know that packing cases aren't meant to be looked upon as pieces of chippendale furniture but the chief evil of this rusting is of course that the timber fails to grip the nails and so makes them useless.

3. ***What is the difference in the time taken to close a case with nails and with the Seal-Less Strapping system?***

We're modest people but at a rough estimate we would say that the most experienced 'nailer' would take, according to the type of case, anything from four to ten times as long as the newest Seal-Less operator. That's another point about Seal-Less — boys and girls can become efficient operators in 20 - 30 minutes.

You say you'd like to know more about Seal-Less? Well, we'd be delighted to supply you with further information but before doing so we must mention that we are unable to add to the list of Seal-Less users unless the newcomers are engaged upon important Government work. Sorry, but in these days of limitation we think it only right to serve the national effort first. In the meantime, we suggest you make a note of Seal-Less Strapping. If you have a post-war file — that's the place for it!

SEAL-LESS STRAPPING LTD., 19, SOUTHWARK STREET, LONDON, S.E.1. Tel. HOP 1661-2

MAGNETA *Sound* EQUIPMENT

AVAILABLE FOR QUICK DELIVERY

For particulars of installation write or phone

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YOUR RETORT TO DERMATITIS

Industrial dermatitis costs industry thousands of pounds a year in loss of time and production.

Boils, sores or the discomfort produced by cracked and septic skin reduce a worker's output even when they do not actually keep him away from work. Keep your workpeople free from these painful, labour wasting skin troubles by providing

Sternocleanse

SKIN SCREEN AGAINST DERMATITIS

which seals the pores against irritants and enables them to be washed off with ordinary soap and water. Awarded the Certificate of the Institute of Hygiene.

Sternocleanse is packed in cases containing 36 tubes, 12 × 2-lb. tins, 6 × 7-lb. tins. Also in 28-lb. and 1-cwt. kegs.

Use Sternocleanse No. 1 for protection against paint, grease, oil, tar, filings, etc.

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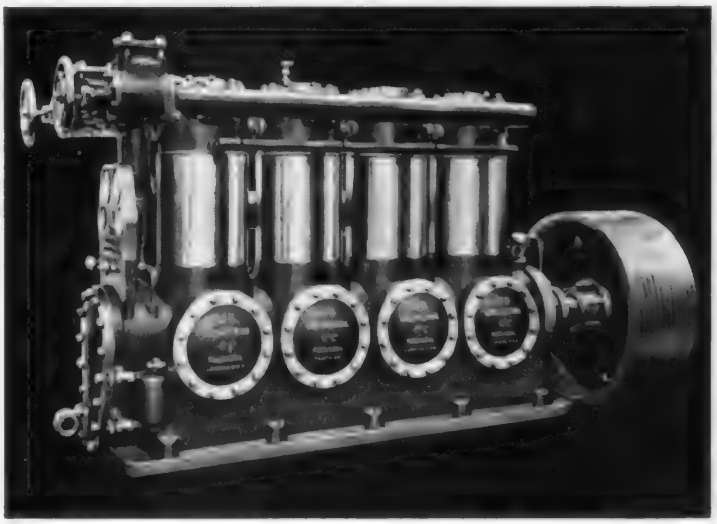
Dependable Refrigeration



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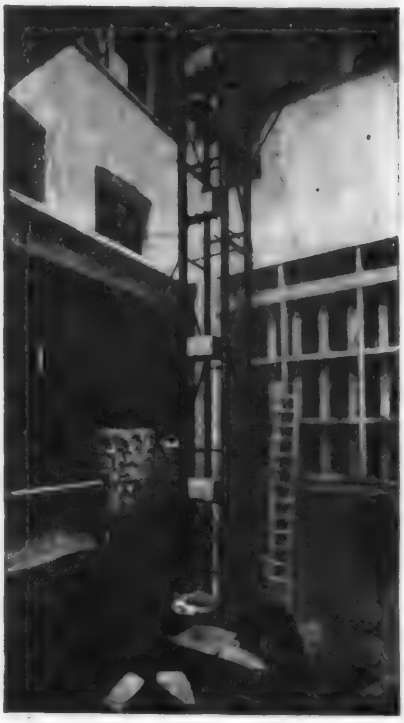

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Works: MAIDEN LANE, KING'S CROSS, N.7

MANESTY
MIXER

THE Manesty Mixer has a capacity of approximately 100 lbs. of powder and is used for the intimate mixing of powders or moist masses.

The Manesty Mixer can be supplied for belt drive or fitted with self-contained motor. The powerful geared drive and sturdy paddle make the Manesty Mixer ideal for dealing with difficult or sticky ingredients.

There is an automatic guard which safeguards the operator from danger and does not interfere with his control of the process.

Once the Mixer is working the guard cannot be moved, but the whole process can be watched by the operator by means of a sliding lid.

The illustration shows the Mixer with the body tilted for cleaning, which is a simple operation as there are no corners where material can lodge.

The Mixer body and paddle can be supplied in stainless steel or in galvanized iron.

Please send for full particulars

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This typical housewife spends her time 'trying out' dishes in the same conditions which prevail in any ordinary home. She follows the directions given on the label and immediately reports any 'flaws.'

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As an additional safeguard against faulty materials entering the Factory constant inspections are made during the process of manufacture.

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Morton

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DOUGH KNEADERS

DOUGH BRAKES

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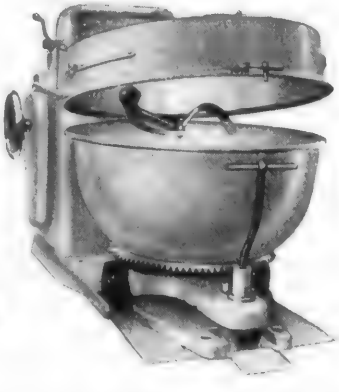

We know the home front is important, but we, like others, have our part to play in this war. Morton Mixers are fulfilling an important National duty in providing food on our ships on the seven seas as well as the need at home.

We ask our friends to bear with us if our delivery is not up to pre-war standard. Priority must be given to Government departments and in doing this we are helping to bring the war to a victorious end.

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We can help you to do it.

It is already being done for hundreds of firms and we are ready to do it for many more.

The methods we use are based on common-sense ideas. Steam is needed for the purpose of providing heat. So first we make sure that the steam is able to give up maximum heat and then that every scrap of heat available is put to the best use where it is needed most.

That seems to be the logical way of setting about fuel economy and machine efficiency. And it always rings the bell.

(Talking about ringing bells, this is a photo we took in the belfry of our parish church on that Sunday morning in November.)

FREE ADVICE on steam saving and process plant efficiency

YOU ARE INVITED to make use of the Spirax advisory service.

Our technical chaps have a pretty good notion of what every type of steam-heated equipment should be capable of doing and they set out to make that equipment do it. So if you have a problem connected with your steam-heating or steam-process plant please send us the facts and we will reply fully. If you would like us to inspect your steam-using plant and then send you a report showing what can be done to save steam and improve machine efficiency, please use the enquiry slip at the right.

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FOR YOUR NAME AND ADDRESS

A143

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A Greeting for 1943

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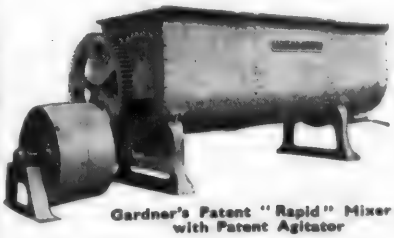
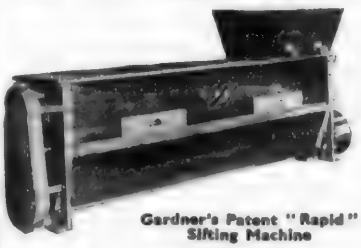
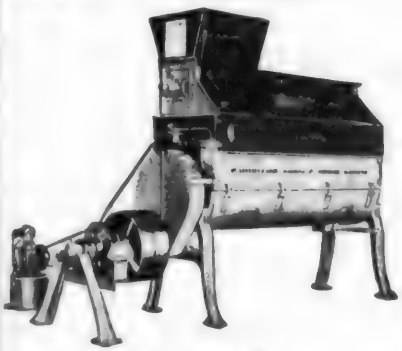
These machines provide THOUGHT FOR FOOD



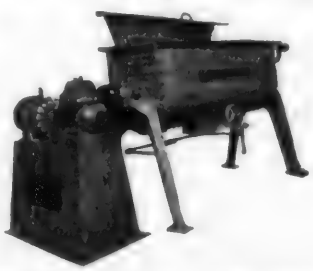
Gardner's Patent "Rapid" Mixer with Patent Agitator



Gardner's Patent "Rapid" Sifting Machine



Gardner's Patent "Rapid" Sifter and Mixer with Sprayer



Gardner's Patent "Rapid" Steam Jacketed Dryer and Mixer

GARDNER'S Machinery for the reducing, sifting, mixing and drying of powders for use in the food industry have been carefully designed to maintain a high standard of product at the lowest possible operating cost. They have proved their outstanding superiority over a period of nearly a century and are the first choice of discriminating manufacturers in all parts of the globe. Many machines have been running continuously for as long as 40 years without breakdown or repair, and they will stand up to any and every sort of climatic conditions. Our service department will be glad to advise on your own reducing process problems without obligation ; just send a sample of your product and we will test it out in our works and let you have our report on the most suitable method of reduction. In our range of models there is one to solve your problem . . . why not get in touch with us NOW ?

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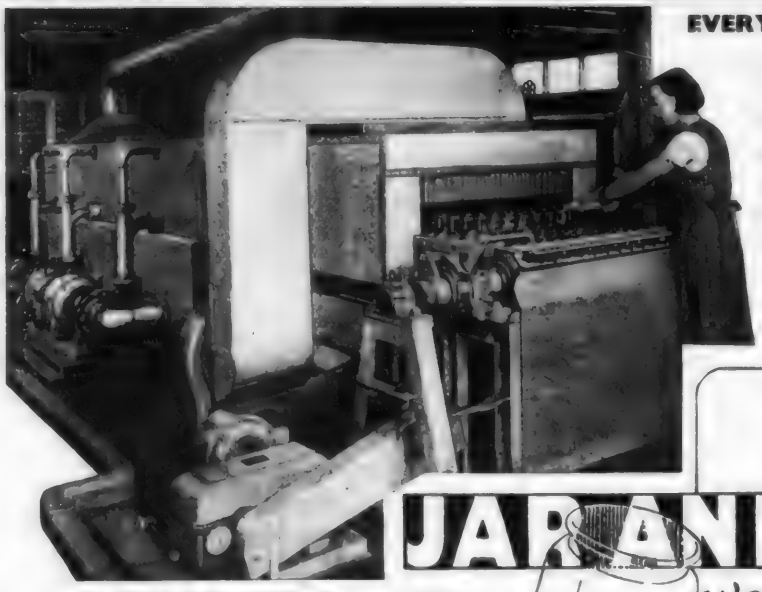

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A Dawson Utensil and Container Cleaning Hydro can be constructed for washing tins, jars, bottles, moulds, trays, baking boards, mixers, basins, bowls, buckets or any other equipment used in Food Industry. Suggestions and specifications will be supplied in response to enquiries stating type of articles to be cleaned.

Dawson JAR AND BOTTLE *washing machines*

are installed by many leading Dairies, Breweries and food packers throughout the country for high speed washing of large quantities of bottles and jars of all sizes and types. Outputs up to 1,000 dozens per hour. Machine for washing and drying small glass jars is illustrated. Output 7,000 per hour.

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STEEL. The skeleton which supports the structure of modern civilisation: the material without which modern war could not be fought. The metal in the production of which Great Britain was the pioneer and is still pre-eminent—witness the world-wide fame of the name Sheffield, and such modern British triumphs as the development of manganese and stainless steels. This pre-eminence is in large part owed to the work of the British chemist, for steel more than any other metal is the result of close liaison between the foundry and the laboratory. Its manufacture is a matter as precise as the dispensing of a medicine prescription. It is the chemist who evolves the formula, analyses the product during the making and tests the finished article. No more than a dozen years ago British research perfected a method of improving the quality of steel by purifying pig-iron. Alike for needle and anchor, for the myriad uses of the parent metal and its countless family of alloys, steel is compounded by the chemist. Nor is the chemistry of iron and steel limited to the metal itself, but extends to its by-products and to the by-products of these by-products. In a sense the output of the blast-furnace is pig-iron. By virtue of the chemist the blast-furnace also yields fertilizers, cement, valuable oils and tar: and from tar, eventually organic chemicals, including dyes and medicinal products. It is the chemist's privilege not only to ensure that British steel shall continue to lead the world, but to ensure that the transmutation of the raw material shall at every stage render its full quota for the common good.

ICI

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PYREX Brand GLASS PIPE LINES permit a visual check on colour, clarity, and rate of flow of the liquids carried, while any crystallization, or formation of lime scale can be immediately detected.

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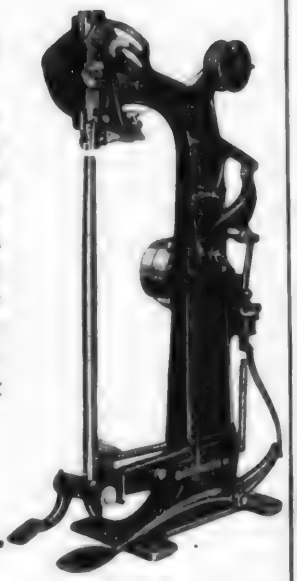

This machine serves for wire stitching the bottoms of single piece corrugated or solid board containers. The pillar type Anvil has 30-in. maximum reach and suffices for firmly fastening the bottom flaps with wire stitches automatically formed, driven and clinched from a reel of Ribbon Stitching Wire 12 by 25 or 12 by 26 gauge. An interchangeable top stitching tongue with adjustable work-table can also be supplied for wire stitching, also the tops of the filled containers in place of taping. Supplied in three styles, viz.: For Treadle use, Line-shaft drive, or self-contained direct motor drive. Speed to 150 stitches per minute.

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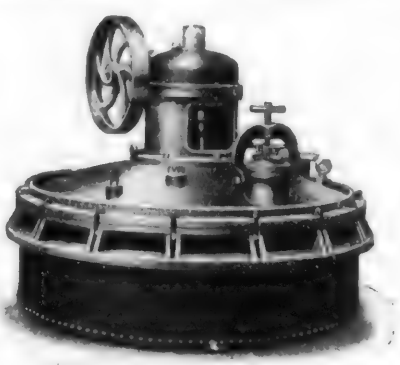

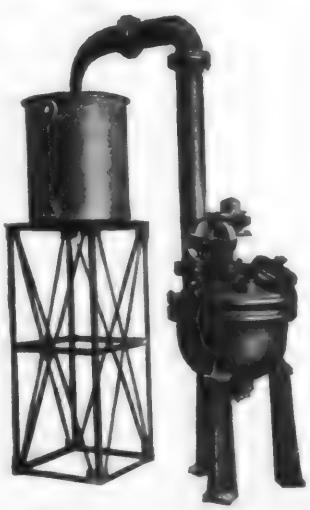

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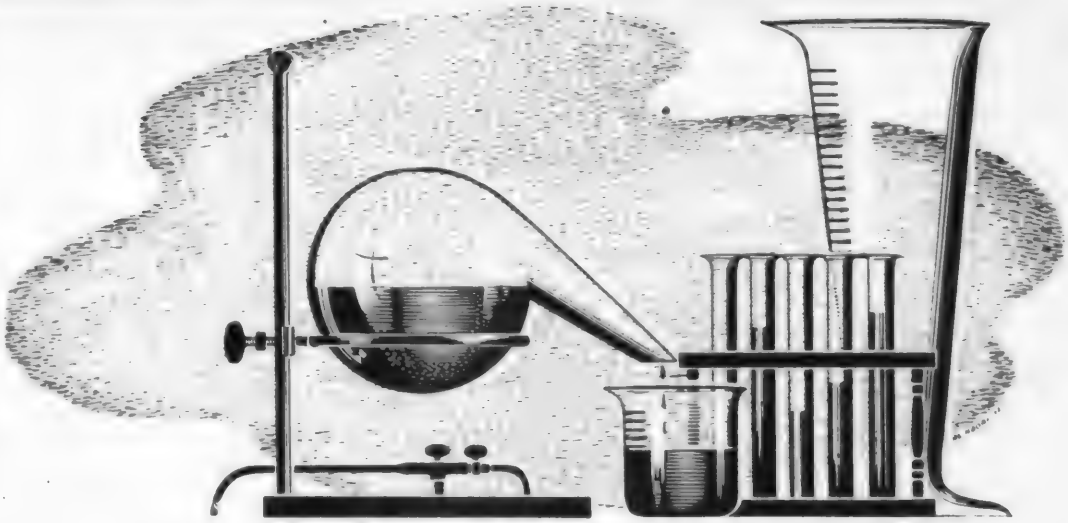

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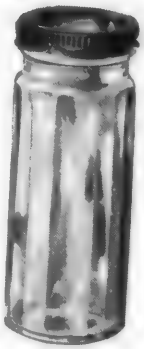

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Fig. 1: Plan of fixed shelving, allowing 30 racks only.

1	2	3	4	5	6	7	8
GANGWAY							
9	10	11	12	13	14	15	
16	17	18	19	20	21	22	
GANGWAY							
23	24	25	26	27	28	29	30

Fig. 2: "Stormor" allows 44 racks in the same area as above, giving 47 more storage capacity.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	
16	17	18	19	20	21	22	
GANGWAY							
23	24	25	26	27	28	29	
30	31	32	33	34	35	36	
37	38	39	40	41	42	43	44

EXPAND your store without increasing the space! These diagrams show how it's done. The top one is the present method, showing fixed shelving and gangways. Below, the transformation caused by *Mobile* shelving STORMOR! Extra racks easier to get at! Let us prove — without obligation — how you can easily

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'AUTOMATIC'

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'AUTOMATIC'

machine for screwing and tightening caps on to bottles of all sizes and shapes. The output is 25,000 per day with one operator—$\frac{1}{8}$ h.p. motor.

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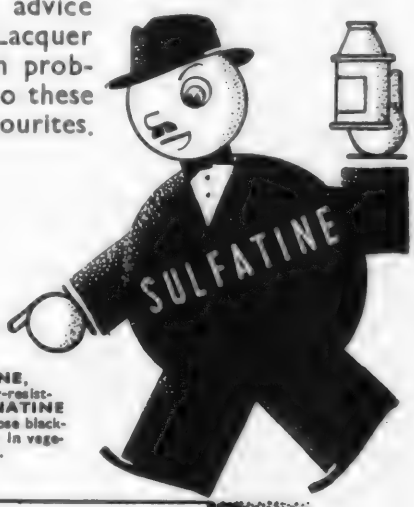

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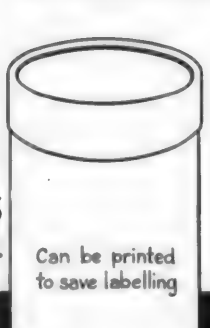

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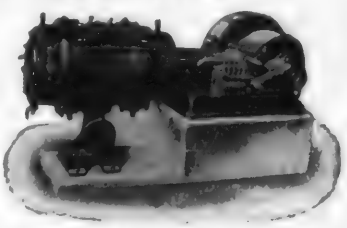

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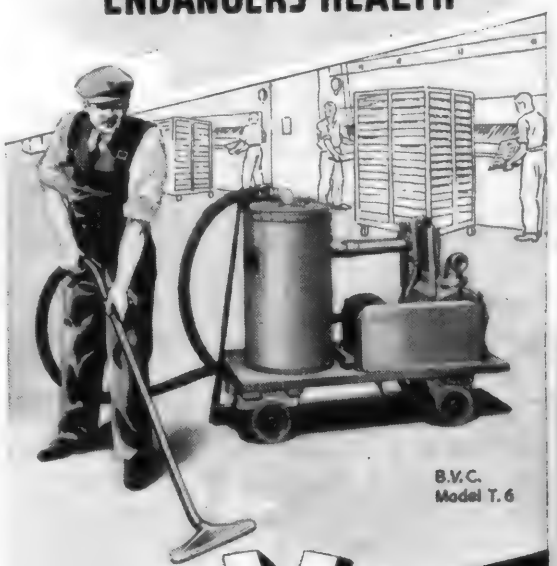

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FOOD MANUFACTURE

Vol. XVIII. No. 1. Published Monthly · January, 1943

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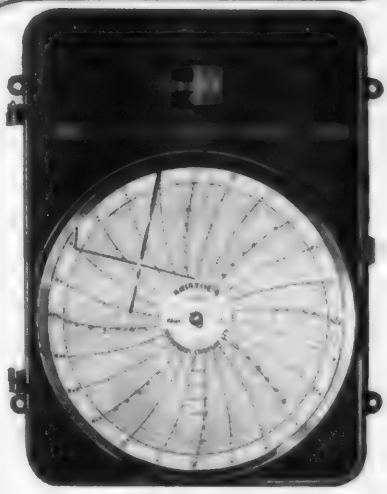

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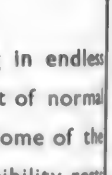

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FOOD MANUFACTURE

Vol. XVIII, No. 1 January 1, 1943

Compulsory Pasteurisation ?

BEFORE the ink had dried on the report of the Committee on Tuberculosis in Wartime, Lord Woolton had reached the conclusion that something would have to be done about it. On November 30 he received the Executive Committee of the Central Milk Distributive Committee to consider what steps could be taken to ensure the safety of the milk supply, and as a result of the deliberations a wide extension of the practice of pasteurisation is expected to take place.

The Minister asked the Central Milk Distributive Committee to draw up and submit to him practical proposals for ensuring the cleanliness of the milk supply and elimination of the risk of tuberculosis infection, and at the same time to indicate the directions in which Government assistance would be required. The distributive trade put forward a suggestion for the establishment throughout the country of central depôts at which all milk, including that of producer-retailers, should be heat-treated. The trade felt, however, that it would be impracticable to apply such a scheme to the whole of the country in a single step. A start would have to be made with the more populous areas.

Two directions in which Government co-operation is considered essential are: (1) The provision of adequate processing plant, and (2) man-power for operating that plant. There is, for instance, a shortage of skilled pasteurisers because so many of these men have been called to the Forces. The Committee on Tuberculosis in Wartime suggests that they should be released.

The Ministry of Food, immediately after the conference, called for a list of manufacturers of pasteurisation plants, bottle washing and filling machines, cooling apparatus and other liquid milk processing equipment, with a view to the allocation to these manufacturers of sufficient materials with which to produce the machinery and equipment that may be required to give effect to the Ministry's plans for dealing with the matter. The list of firms was called for "as a matter of urgency".

Food and Appetite

In a letter to the *Sunday Times*, Professor J. Plesch stresses the importance of the preparation of food. "Anybody," he says, "who has watched consistently over many months the waste on the plates in public feeding centres can see easily that there is a direct relation between the amount of waste and the quality of the cook on duty; which overrides all other varieties due to such factors as extra hard work, cold weather, time of day, etc. The amount of waste is a much more valuable indication of the suitability of food than any laboratory analysis."

Everybody must agree with the psychological aspect, although the thought does occur to us that in times of extreme shortage of food (from which our Navy and Mercantile Marine have so far happily delivered us) too attractive cooking might produce an undesirable appetite.

Professor Plesch makes one statement which may be questioned. He says: "Our native foods served to keep our ancestors in health even without vitaminology. It is the duty of science to find the reasons for such facts of experience, and it will only be successful if it is in agreement with these."

Such a statement does not tally with data given in Dr. Drummond's book, *The Englishman's Food*. In the Middle Ages the peasant ate very few vegetables, and fruit was only available for a short season in the summer. There must therefore have been a serious deficiency of vitamin C in his diet, and, judged by modern standards, another serious defect of the peasant's diet was the low proportion of protein and fat derived from animal foods.

Writing about the nineteenth century, Dr. Drummond quotes Engel (*The Condition of the Working-Class in England in 1844*). Engel draws a grim picture of the poor people of London collecting potato parings, rotten vegetables and vegetable refuse to eke out their miserable diet.

A study of the foregoing details and others to be found in Dr. Drummond's book seems to indicate that, although our native foods were capable of keeping our ancestors in health, the trouble was that they could not get them.

THE EDITOR SENDS SEASONAL GREETINGS TO ALL READERS

Maidenhead Food Poisoning

Mention was made of the Maidenhead food poisoning case in FOOD MANUFACTURE, Vol. XVII, No. 11, p. 306, in connection with which has been published in the *Medical Officer* a report by Dr. J. J. Paterson, Medical Officer of Health, East Berks United Sanitary District.

It will be remembered that pressed pork made from three small pigs produced a number of poisoning cases, and that one old man had been proved to have died as a result of eating the brawn.

Dr. Paterson comments on the unconfirmed and exaggerated statements as to the origin and cause of the trouble made at the time, but considers the outbreak as not without interest to those concerned with public health, as it illustrated the not unfamiliar difficulties that attend such investigations —false clues and promising lines of enquiry that end nowhere.

Full details of the course of the enquiry are given, and it certainly shows that the investigation was thoroughly carried out.

Dr. Paterson states that it would seem a reasonable conclusion that at least one of the three pigs was infected with *B. typhi-murium* (*B. aertryche*, the pathologist agreed, is identical with *B. typhi-murium*) at the time of slaughter. It is difficult to understand (Dr. Paterson says) how the organism survived soaking overnight in brine and two hours' boiling next day, but it is conceivable that in the centre of the larger joints there were survivors, and these were spread in the subsequent cutting up and boning process. How, when and where the pig became infected may remain a mystery. Dr. Paterson pointed out that while the investigations in many cases ended in a blank wall, one useful result was attained—it disposed of the scandalous rumour that "diseased, rat-bitten pigs" were "passed by Government inspectors" for human food.

Dehydration in America

In a recent article published in *The Canner*, Dr. W. V. Cruess, of the University of California, who has recently received the Nicolas Appert Award from the Chicago Section of the Institute of Food Technologists, gives a useful summary of the dehydration of vegetables and fruit. Dried vegetables were used by the British Army during the Boer War, and several barrels of the dried products were stored, and twenty years later were used in the last war.

The lack of blanching was the cause of the poor quality of the old-style product. Dr. Cruess stresses the need for *thorough* blanching. Peroxidase is one of the best enzymes for use as an indicator of its adequacy. If it is destroyed, as shown by the customary test with guaiacol and hydrogen peroxide, the product will keep well. If only catalase is destroyed and the peroxidase survives, then the product may not keep. Therefore, those who advise blanching until the catalase test is negative but the peroxidase test still positive, are in serious error. Dr. Cruess favours steam and not water as the blanching agent.

The other main principle of successful vegetable dehydration is drying to extremely low moisture content. Most vegetables should be dried to below 5 per cent. moisture content for best keeping quality.

Most dehydrators operate at safe finishing temperatures—usually 140° to 145° F. is the finishing range. A greatly increased capacity is obtained by operating at about 180° F. while the product is wet. In other words, the parallel current system is used during the initial stages and the countercurrent during the final stages of drying. The famous Edit hydrator of Canada is built so to operate.

Packaging is another great problem in the handling of dehydrated vegetables. In order to protect them from insects, about all that can be done is to pack them in metal or glass containers. Packaging in nitrogen or carbon dioxide to avoid or reduce oxidation is advised.

Some new commercial developments include the production of drum-dried vegetable *purées*, and spray drying may also come into its own for powdered juices.

In general, Dr. Cruess states, the dehydration of vegetables has been greatly improved over the methods in use in the last war, and many of the dehydrated vegetables, when refreshed and cooked, compare very favourably with the canned articles.

Is Saccharin Harmful ?

A large number of enquiries about saccharin and its effects on the human body are reported in *New Health*, November, which also reviews some of the research into its properties.

Mention is made of the observations of Hester and Folin on behalf of the Government of the U.S.A. in 1911, who found no effects of any kind after 300 mgs. daily had been continued for a month. H. Staub and R. Staehelin (*Med. Pract.*, 1936, ii, 419) have reviewed the position in more recent years, but (it is stated) nothing has come to light to invalidate Hester and Folin's original observations. At a recent annual meeting of the Council of Foods and Nutrition of the American Medical Association it was stated that small doses appear to produce no ill-effects, but larger doses such as 1·5 grams may cause gastro-intestinal disturbances. It is hardly likely that this amount of saccharin would ever be consumed in one day, as on a basis of sweetness it would be equivalent to 1½ lbs. of sugar. The Council, however, reiterates its views that indiscriminate use of saccharin is not advisable and that its presence in any food product should be clearly indicated to customers.

In a recent letter to *The Times*, Miss I. H. Rogers, organising secretary of the Diabetic Association, wrote that: "The Diabetic Association has, of course, fully investigated the use of saccharin as a sweetening agent and can state quite definitely that saccharin is harmless. It is not absorbed by the body at all, and cannot therefore injure the tissues. We suggest that the time has come to explode once and for all the fallacy that saccharin is harmful in any way whatsoever."

New Health comes to the conclusion that a limited consumption of saccharin is unlikely to produce ill-effects, but should these become apparent owing to personal idiosyncrasies, then the medical practitioner should be consulted.

On the other hand, the *B.M.J.*, 1913, ii, 533, uttered a warning against the indiscriminate use of saccharin as a drug or substitute for sugar, citing research at the McFadden laboratories of the Lister Institute, which had shown that it is a powerful auxetic, like several other constituents and derivatives of coal tar. In his latest report to the Hull Corporation the local public analyst reiterated his plea that packers of food and beverages containing saccharin should be under compulsion to indicate the presence of this substitute on the label, accompanying this recommendation with the statement that saccharin was harmful. Sir Alexander MacGregor, Medical Officer of Health in Glasgow, commenting on this, said he would be chary of frightening people off its use in wartime. Boiled down to practical terms, it appears that we may take a little saccharin, but if we get a pain we should go to a doctor, who will tell us to stop taking it.

Fish Zoning

Since the beginning of November much criticism of the fish zoning and distribution scheme has been voiced by the different fish trade organisations and others. At the end of November the Fish Industry Trade Council, contending that the scheme imposed by the Ministry of Food, after a trial extending over five weeks, had failed to achieve its object and had resulted in the serious maldistribution, with anomalies and injustices abounding, requested the Ministry of Food to substitute a scheme to be worked out in consultation with the Joint Council which would avoid the inequalities inherent in the original scheme. The result of this was announced on December 8. Lord Woolton flatly refused the fish industry's demand for the withdrawal of his zoning scheme, and he informed the Fish Industry Joint Council: "I am not prepared to allow this scheme to be sabotaged by anybody. I am trying to feed the country. The country has enough to do to fight one enemy. We don't want to dissipate our energies by fighting too.

"Your trade was making an extravagant use of transport facilities, and you have been told in unmistakable terms that such extravagance was hindering the war effort and that that was the reason for the introduction of the zones. In spite of this knowledge some of you have decided to attempt to secure the withdrawal of the scheme.

"I recognise that the scheme has interfered with trade practices and trade connections . . . but it might have been much nearer perfection if the members of your trade had come forward and helped it at an earlier stage. I shall welcome the assistance of any member of the Council in making adjustments, but I must make it crystal clear that I will consider suggestions that are directed to the improvement of the scheme and not to its abandonment."

At the time of this writing, fish shortage is reported to be acute in London.

Mr. Mabane, Parliamentary Secretary to the Ministry of Food, speaking in the House of Commons, said that the scheme is working satisfactorily "in most parts of the country" and that on a certain day 206 tons of fish had been sent to Billingsgate, against a daily average of 300 tons. To the question, "Where has it all gone to?" Mr. Mabane had no reply to make. A member, Mr. Lipson, intimated that he would raise the subject in debate. We shall be interested to know the solution of the mystery.

Barley Grower's Complaint

The difficulties which hedge round the matter of the sampling of farm products are demonstrated by a communication we have received from a well-known farmer. He says: "For the second year in succession my barley deliveries have been queried by some unknown maltster. This year the barley, which was disappointing in yield, thrashed out something below the best. The grain was sold, on sample, to a merchant and lay in my barns, presumably at the buyer's risk, for six weeks; it was then collected by a haulier and taken to some unknown destination. Three days afterwards came a letter from the merchant buyer, in which he said that the anonymous maltster who had received the barley had stated that it had been delivered 'hot, stinking and mouldy', and that 'it is now in store waiting removal'.

"It happened that I had twenty-seven sacks of the same barley still in the barn (I only grew the one lot, and all was harvested, threshed and stored together), so in the presence of two witnesses several of these sacks were opened and a fresh sample drawn. Only one sack showed the faintest trace of smell, but the total sample was, if anything, better than that on which the sale was made. This sample has been sent to the merchant, and there the matter now lies."

The Milling Industry

PROGRESS IN 1942

A. J. AMOS, Ph.D., B.Sc., F.I.C.

THE PAST twelve months have seen the milling industry enter an entirely new phase, and it is no exaggeration to say that 1942 has added a new page to the history of flour milling, inasmuch as it has seen the birth of outstanding and indeed revolutionary technological developments.

During the first two years of the war the production of flour was in some respects a simpler proposition than it was in peacetime. It is true that the miller had no free choice of wheats, and was unable therefore to balance his blend with that degree of precision to which he had been accustomed, but his task had been reduced to the production of one grade of flour of fixed extraction from a comparatively simple blend composed mainly of good-grade Manitoba wheat.

How different was the position during most of 1942. Since the Spring of that year the miller has been obliged to mill to an unaccustomed extraction and, moreover, to do this in such a way that the flour shall possess certain analytical data.

The difficulties which these regulations imposed upon the miller were later accentuated in many districts by the necessity of employing in the blend as much as 40 per cent. of new crop English wheat. The many new problems presented by the 1942 Regulations were intensively studied by all associated with the industry, and the co-operative efforts of the miller, the milling engineer and the cereal chemist led to their solution through the agency of technical developments which fully justify the description of present-day milling—recently quoted by the Director of the Millers' Research Association—as biological engineering.

Fortified Flour

During the first few months of 1942, millers were producing white flour of 75 per cent. extraction fortified with synthetic vitamin B_1. The proportion of the vitamin required to effect the necessary fortification was extremely small—0·2 gram per sack of 280 lbs.—and before the scheme could be successfully put into practice it was necessary to devise a reliable procedure for the incorporation and uniform distribution of this minute amount of aneurin.

The problem was solved by the preparation of a "concentrate" which would raise the B_1 content of the flour to the required level when mixed with it in the proportion of 1 oz. per sack.

Automatic mixers capable of continuously adding a powder to the flour stream in the proportion of 1 oz. per sack were on the market and, in fact, were already installed in many mills. The concentrate was prepared by thoroughly mixing together a solution of aneurin and a thin flour batter and spray-drying the mixture.

A scheme for the control of fortification by the frequent chemical assaying of flours from all mills for B_1 was evolved, and the details of two suitable methods, a visual and a fluorimetric adaptation of the thiochrome technique, were settled and published (Nicholls, Booth, Kent-Jones, Amos and Ward, *Analyst*, **67**, 15).

Canadian flour imported into this country was required to exhibit the same B_1 content as fortified home-milled flour, and each arrival of such flour was therefore also assayed by the panel of testers.

National Wheatmeal

In the Spring of 1942, the official extraction was raised to 85 per cent., a change which at that time entailed the production of what was obviously a meal instead of a white flour. Such meals were expected to contain one International Unit of natural vitamin B_1 per gram and to have a fibre content not greater than 0·85 per cent.

The general method of making this National 85 per cent. Wheatmeal was essentially to mill for 75 per cent. flour, but to take off with the flour 10 per cent. of by-products drawn from the stocks which normally went to the wheatfeed. Such stocks vary greatly both in B_1 and fibre content, and it was not long therefore before the majority of millers had had their individual wheatfeed stocks analysed and were segregating for incorporation in the flour those high in B_1 but low in fibre.

Such meals met satisfactorily the requirements of the official Order and the recommendations which had appeared and moreover were comparatively simple to make, but the millers were nevertheless not content to continue the manufacture of this rather dark and coarse type of meal.

They realised that if it were possible to mill to 85 per cent. extraction in such a way that the final product was finer and more floury, and hence exhibited more of the attributes of white flour, the product would find considerably more favour among consumers and would lighten the task of the baker by yielding a dough which was more responsive and lively and better able to withstand the mechanical operations of automatic bakery plants.

Modifications in Milling Process

The millers, aided by others directly associated with the industry, concentrated therefore upon the possibility of producing 85 per cent. flour rather than 85 per cent. meal. The theoretical answer to the problem was obvious: some of the branny matter present in the wheatmeal would have to be replaced by endosperm normally present in the wheatfeed.

The practical solution, however, was certainly not so obvious. The endosperm which is to be found adhering to the bran particles in wheatfeed is there because the normal milling procedure is incapable of effectively separating it from the branny matter. The abstraction of some of this residual endosperm for inclusion in the 85 per cent. meal could be accomplished, therefore, only

by departing from the normal and accepted milling procedure. The millers were not, however, deterred by this and willingly introduced modifications into their process, and in some instances installed some additional plant.

The problem naturally was approached in various ways, but the successful schemes involved one or more of the following modifications: high releases on the first and second breaks, modified differential on break rolls, addition of a fifth break, employment of finely fluted rolls on lower reductions, extension of the scratch system.

The change in the nature of National Wheatmeal was, of course, gradual, but the product being manufactured at the end of 1942 was very different to that being made seven months earlier. The later products were much finer and whiter, and, indeed, the best of them had more of the characteristics of a white flour than of a meal. They yielded doughs which responded better to manipulation and which were certainly more suitable for plant work, while the bread they produced was more attractive, lighter in texture and more easily masticated. *And these marked improvements were accomplished without any drop in the vitamin B_1 content of the flour.*

Analytical Data

Mean values for certain analytical data furnished by meals from all over the country examined in the author's laboratories in May and in November, 1942, illustrate the success which attended the millers' efforts to improve the National 85 per cent. Wheatmeal.

Average Value in—	Ash.	Fibre.	Vitamin B_1.	Granularity.	
				Tails 32 G.G.	Tails No. 8 Silk.
1942	per cent.	per cent.	I.U./g.	per cent.	per cent.
May	0·95	0·80	1·00	2	9
November	0·84	0·50	1·00	Nil	3

It may truly be said that, since the spring of 1942, the millers of this country have revolutionised the milling of wheatmeal. Their efforts have made it possible to mill to 85 per cent. extraction in such a way that the product is essentially a white flour and yet contains the same amount of vitamin B_1 as a wheatmeal.

Additions to Flour

The decision to fortify flour with calcium in the form of chalk was announced by the Government when the proposed vitamin B_1 addition was made public early in the war.

It was not until late in 1942, however, that the scheme was commenced, and by the end of the year the addition was being made in only comparatively few mills.

Some delay was anticipated because *creta præparata* —the form in which the chalk was to be added—is not easy to deal with in an automatic mixer, and an investigation into the practical difficulties was necessary. Some further delay may have arisen through a shortage of the type of mixers finally decided upon, but both these obstacles could have been surmounted comparatively quickly. Can the prolonged delay mean that the initial apparent enthusiasm of the Government for this scheme has waned?

There is every indication that in the very near future —perhaps even by the time this review appears in print —further additions to flour will be made compulsory.

A plan for the incorporation in flour of a proportion of another cereal, probably oats or barley, has been under consideration for some time and certain problems which it presents have been investigated. There is some doubt, however, about the method by which the admixture will be accomplished.

It is understood that the authorities favour the distribution to millers of oat flour which has been produced on oat-milling plants, and the incorporation of this product in National flour in the stated proportion.

It seems to the author, however, that the additional transport, labour and fuel necessitated by the general adoption of such a scheme can be justified only by proof that it would be impracticable to mill upon a flour-milling plant a wheat blend containing the required proportion of oats.

It is true that the inclusion of oats in the wheat blend might lead to certain difficulties in some of the small mills, and in these instances the oat flour procedure might be the better proposition, but the larger mills could certainly deal satisfactorily with the wheat and oat mixture.

The proposed addition of other cereals to flour differs from the incorporation of *creta præparata* in that it is not designed to meet a dietary deficiency. The function of the scheme is the saving of shipping space by reducing the quantity of imported wheat required to provide for the nation's flour consumption. It is possible that a later step to this end may be the inclusion of potato flour in our bread.

General Matters

When the Government took over the control of flour mills at the outbreak of war, it was agreed that the basis upon which a miller's remuneration would be calculated should be settled by negotiation between representatives of the Government and of the industry.

The formulation of an equitable scheme was a task of considerable difficulty, and it was not until 1942 that the negotiations were concluded and an agreed settlement reached.

The remuneration agreement is naturally somewhat complex, since it has to provide for reasonable treatment of mills differing greatly in size and in economic situation, and needs to take into account differences between the wartime output and the pre-war datum. In view of the many difficulties which faced the millers' representatives concerned in the negotiations the basis of the final agreement can, however, be regarded as a reasonable one.

Many millers used to separate wheat germ when they were milling white flour, but this practice is prohibited during the manufacture of National Wheatmeal. The introduction of the 85 per cent. extraction Order meant, therefore, that germ ceased to be obtainable and, as a consequence of this, the manufacture of vitamin B_1 foods and concentrates which were prepared from germ could not be continued.

It was realised, however, that some of these products were of undoubted value in the treatment of certain ailments and conditions and had a definite place in medical practice. In order that they might continue to be available the authorities agreed to permit the separation of germ when 85 per cent. meal was being produced for purposes other than that of bread-making.

No objection can be raised to the abstraction of germ from such flours, since they represent but a small proportion of the total flour consumed, and, moreover, during the production of self-raised goods or of biscuits most of the vitamin B_1 present in the flour is destroyed. A return of the amount of germ separated from such flours has to be made to the Ministry of Food, who then allocate it for use in one of the accepted priority medical foods or concentrates.

The Millers' Research Association continued its useful work during 1942. The results of investigations into various practical problems which were undertaken —such as the keeping properties of National Wheatmeal, the production of finer and more floury meals, and methods for the addition to flour of *creta*—were circulated to members of the industry in confidential reports, but important papers were also published in the scientific journals.

The subjects treated in these publications included the determination of vitamins in cereals, the analytical control of fortification of flour with *creta*, and the distribution of vitamin B_1 in the wheat grain.

Numerous scientific studies of wheat, flour and bread were reported during 1942, but references in this article will be restricted to investigations which should prove to be of direct interest to the milling industry of this country.

Distribution of Vitamin B_1 in Wheat Grain

The results of studies of the distribution of vitamin B_1 in the wheat grain were reported from several sources during 1942.

The findings of the various workers, which were in agreement, throw new light on certain aspects of milling technology and are likely to have an important influence upon post-war milling engineering.

The first paper upon this subject (Jackson and Whiteside, *Scientific Agriculture*, **22**, 366) contained data which revealed that the germ-end third of a wheat grain contained over 70 per cent. of the total vitamin B_1 of the grain *even when the germ itself had been probed out*.

Later in the year the explanation of Jackson and Whiteside's findings became apparent from the independent work of Hinton (*J.S.C.I.*, **61**, 143) and Ward (paper not yet published). These investigators found that the richest source of vitamin B_1 in the wheat grain was the *scutellum—i.e.*, the membrane which separates the embyro proper from the adjacent endosperm.

Hinton reported that the *scutellum* part of the wheat germ is probably ten times richer in B_1 than the embryo, and his conclusion is substantiated by Ward, who determined the B_1 content of *scutellum*, which had been separated from wheat by a most laborious series of dissections, and obtained a value of 49·5 I.U./g.

Maintaining B_1 Content of Flour

These discoveries reveal that, in order to maintain the B_1 content of a flour at a high level, it is necessary to include in the flour a high proportion of the *scutellum* of the grain. Millers, although unaware at the time of the explanation, were of course maintaining a high B_1 in their later finer and more floury 85 per cent. " meals " by this very means, and it may be said, therefore, that during 1942 milling practice was in advance of biological discovery.

The work of the above-mentioned investigators also affords a probable explanation of the fact that in Australia the flour contains a higher proportion of the total B_1 of the grain from which it is milled than it does in this country. Wheat is usually milled at a lower moisture content in Australia, and the *scutellum* would consequently be in a more friable condition and thus tend to powder up more easily.

Digestibility of Different Breads

The vexed question of the relative digestibilities of different types of bread has been the subject of several published discussions during 1942. Attention was focused on this problem by the calculations contained in an important paper by Wright which was published in 1941 (*Chemistry and Industry*, **60**, 623.).

Krebs and Mellanby (*Lancet*, March 14, 1942) criticised the digestibility values employed by Wright, and pointed out that the only values available for 85 per cent. extraction flour had been obtained by interpolation. They therefore conducted feeding trials with human subjects and obtained data which suggested that there was less difference between the digestibilities of 75 per cent. and 85 per cent. flour than had been accepted by Wright.

This criticism was replied to by Wright (*Lancet*, August 8, 1942), who drew attention to sources of error in Krebs' and Mellanby's scheme of experiments, and then proceeded to establish mathematically the digestibilities of the two types of flour from previously recorded relationships between extraction and digestibility.

Moran and Pace (*Nature*, August 22, 1942) argued that it was unsound to employ the degree of extraction as the basis for calculation of digestibility, but suggested that the fibre content could be utilised as an index of digestibility. Employing this method, they obtained figures for 75 per cent. and 85 per cent. flours which showed a difference intermediate between those suggested by Krebs and Mellanby and by Wright.

Gain or Loss in Nutrients

This question of the relative digestibilities of 75 per cent. white flour and of 85 per cent. wheatmeal is of fundamental importance in calculations designed to show the gain or loss of nutrients to the nation consequent upon the compulsory change from one type of flour to the other, but the 1942 publications upon this subect make it clear that, in our present state of knowledge, the only certain fact is that 85 per cent. meal is less digestible than 75 per cent. white flour.

The actual difference between the digestibilities of the two types is still unsettled and, in fact, since the digestibility of a wheatmeal of given extraction will, as Moran and Pace have pointed out, vary appreciably with the method of production, this difference is not constant.

Nutritive Value of Bread

Our knowledge of the nutritive value of bread was advanced in 1942 by two important papers published by McCance and Widdowson (*Journal of Physiology*, **101**, 44, and *Lancet*, May 16, 1942).

The experiments in each investigation were performed upon human subjects and were spread over a period of

nine to twelve months. Two types of flour were compared—namely, white flour and meal of 92 per cent. extraction.

The experiments reported in the *Journal of Physiology* show that the calcium, magnesium, phosphorus and potassium in diets made up with 92 per cent. meal were less completely absorbed than the same minerals in diets made up with the white flour. When the bread was fortified with calcium carbonate, the absorption of calcium was improved but the absorption of phosphorus was slightly depressed.

The other investigation revealed that, whereas iron was absorbed from diets in which white flour constituted 40 to 50 per cent. of the total calories, no absorption of iron occurred when the white flour was replaced by 92 per cent. extraction meal. In other words, the results of this study suggest that, contrary to common supposition, brown bread is a poor source of iron.

Work on the Vitamins in Cereals

Work on the vitamins, particularly those of the B group, in cereals was continued and papers were published on methods of assay and upon the data afforded by the application of these methods.

Booth (*Analyst*, **67**, 162) published a note to the effect that the accepted method for the determination of B_1 in white flour (*Analyst*, **67**, 15) could, with slight modification, be applied to National Wheatmeal.

The determination of riboflavin in cereals has been reported upon by Barton Wright in this country (*Nature*, June 20, 1942) and by Andrews, Boyd and Terry in America (*Cer. Chem.*, **19**, 55), and papers dealing with the nicotinic acid content of cereals have been published by Thomas, Bina and Brown (*Cer. Chem.*, **19**, 173, and *Cer. Chem.*, **19**, 447).

The experience of workers in this country suggests that there are still difficulties to be overcome in the determination of the nicotinic acid content of cereals, but that reliable values for the riboflavin content can be obtained by the microbiological method. It is generally agreed that this is to be preferred to the chemical method.

The destruction of vitamin B_1 which may occur during the baking of cereal goods has been investigated by Dawson and Martin (*J.S.C.I.*, **56**, 13) and by Barackman (*Cer. Chem.*, **19**, 121).

The former authors found that, during baking, fortified white flour lost about 20 per cent. of its total B_1 content, while 85 per cent. wheatmeal lost about 27 per cent. Wholemeal flour (98 to 100 per cent.) lost about 34 per cent.

Barackman confined his studies to self-raised biscuits prepared from fortified flour, and he concluded that, provided the *p*H of the baked biscuit is 7·1 or lower, the loss of added B_1 is only about 15 per cent. Experiments performed in this country, the results of which will be published, indicate, however, that the production of various self-raised goods under English conditions often leads to an appreciably greater loss of B_1.

At the close of 1942, Greer, Mounfield and Pringle—members of the staff of the Millers' Research Association—published three methods suitable for the determination of added *creta præparata* in National flour (*Analyst*, **67**, 352). This is undoubtedly a timely publication and will prove distinctly useful to the chemists called upon to exercise control over the calcium fortification of flour.

"3-in-1" Container for Dehydrated Foods

For months the U.S. Army has been seeking a substitute for tin and other critical metals as a packaging material for overseas shipments of dehydrated foods. This research, according to the War Department, has now been completed at the Quartermaster Corps Subsistence Laboratory in Chicago with the development of a new "3-in-1" package which is moisture-proof and offers protection against insects. In addition, it can be submerged in salt water for several hours without damage to the contents, states *The Canner*.

The container, which holds five gallons, was designed primarily for shipping white potatoes, sweet potatoes, beets and yellow turnips, but it has performed so well under rigid service tests that it shows promise for packaging other dehydrated products.

Under the packaging method formerly used, the purchase of a million pounds of dehydrated products would require about 250,000 pounds of tinplate or other critical metal. The new system utilises specially treated paper, fibre and wood. The only metals needed are relatively small amounts of lead and steel wire.

A feature of the "3-in-1" system is the widespread use of laminated paper—that is, two or more sheets of paper and lead foil fastened together with adhesive coatings that make them waterproof. Several laminating agents, notably asphalt and wax, have proved to be acceptable.

The first step is to place five gallons of dehydrated food inside a laminated bag made of glassine paper. This container is then put into a somewhat heavier, or main, bag, which is insect-resistant and moisture-proof. On the outside of the main bag is a layer of kraft paper (the brown kind usually used for wrapping groceries), which is laminated to a thin sheet of lead foil. The inside layer is a vapour-proof Cellophane.

The third step is to place the main bag inside a carton made of solid fibre, which is a weather-proof paper compound. Finally, two of these cartons, each containing five gallons of dehydrated food, are packed in a single shipping case which may be made from any one of three standard types of materials: a weather-proof solid fibre, a nailed wooden box, or a wire-banded wooden box.

Contractors supplying dehydrated white potatoes, sweet potatoes, beets and yellow turnips to the Quartermaster Corps are being informed of the new packaging requirements. However, they are permitted to use metal containers until such time as the new packages become available or until present stocks of metal cans in their possession are exhausted.

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in Food Manufacture should not be taken as an indication that they are necessarily available for export.

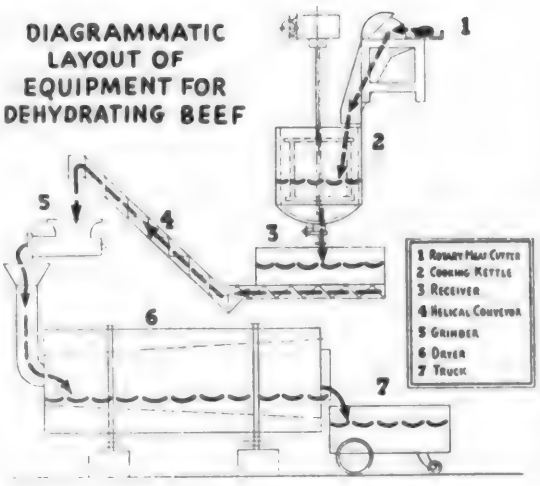
Meat Dehydration

THE GENERAL processing method developed by Swift and Company's organisation has recently been released by the Company. The following is a brief description of the different stages of the process.

The boned beef is fed into a rotary meat cutter, which cuts it into 2-inch cubes. Cooking is then carried on for 30 minutes or more at an internal temperature ranging from 160° to 175° F. with mechanical agitation.

The contents of the cooking kettle are discharged into a container and then, by means of a helical conveyor, to the grinding machinery. The precooked meat receives a fine grinding at this stage.

From the grinder the meat goes to the drier, which is a tube rotating under a horizontal plane inside a jacket through which pass streams of hot air. Louvres in the drier force the air directly through the granular meat, and the latter slowly emerges at the far end of the tube into sanitary metal trucks, which convey it to packaging machinery.



Problems Involved

Swift and Company state that the nutritional and chemical problems involved in the dehydration of meat resolve themselves into two questions :

(1) The nutritional properties of the dehydrated product.

(2) Its keeping properties.

Modern processes of dehydration quickly remove water from fresh meat at low cooking and drying temperature and under other conditions that make for maximum retention of essential minerals and vitamins. The Swift research staff express confidence that the product which they have developed " should be satisfactory from a nutritional standpoint. There is little chance for loss of the nutritive value of the meat, since nothing need be thrown away in the form of juices or broth. Loss of vitamin potency during processing is minimised, particularly by low-temperature handling.

" As far as is known, the proteins are no more affected than they would be in normal cooking procedures, and there is reason to believe that the entire process is less destructive to some of the proteins than ordinary household cooking. Mineral elements are retained in the product because they are stable and are not discarded in juices or broths."

Fat Stabilisation

To ensure long-keeping qualities it is necessary to eliminate the possibility of oxidation of the fat content. Stabilisation can be attained in at least two ways that are commercially practicable and which are exemplified in the processing variations accorded to beef and pork.

Beef, after trimming of excess fat, is cooked in small pieces in a minimum of water. The meat juices which separate at the start of the cooking are reabsorbed before the end of the heating period. The entire contents of the cooking vessel are finely ground and placed in a rotary drier, where the dehydration process is completed.

Dehydrated beef keeps well of its own accord when properly dried and packaged. The Swift method of compressing the product in the container drives out air, and then the tin is hermetically sealed. This cutting off of air and light has so far been sufficient to guard against any chemical change, and it is stated that the product remains wholesome for an indefinite period.

Fat stabilisation in dehydration of pork is not so simple. The amount of the fat, as well as physical structure of the meat, which does not permit reabsorption of the liquor during the cooking process, makes several extra stages necessary in processing.

It is not practicable to reduce the trimmable fat in the pork that is to be precooked to less than 20 per cent. This percentage would result in considerably more fat than could be controlled in the finished product. Hence reduction must take place in processing; the excess must be removed in precooking.

Treatment of Pork

The precooking, from 1½ to 2 hours, yields a mixture of cooked meat, the natural liquor, and fat. All the contents of the kettle are run through a press, which squeezes out the liquor and the fat. The latter two, in combination, are put in a container and the fat is skimmed off, just as it is done in the making of lard.

This stage leaves the liquor in a very dilute form, from which most of the water is then evaporated until the residue is about the consistency of a thick gravy.

The pork from which the liquor and fat have been removed is ground as in the dehydration of beef, and then fed into the rotary drier. It emerges dried down to about a 5 per cent. moisture content, and is thereupon mixed with the concentrated liquor which has meanwhile been obtained, and part of the fat. The resultant product, dehydrated pork, as processed according to the Swift and Company method, has a 40 per cent. fat content and 10 per cent. moisture.

" It seems likely, however," Swift technologists mention, " that because of the higher percentage of fat in the pork, compared with dehydrated beef, there may be a decided advantage in using an antioxidant in the former."

The Confectionery Industry

PROGRESS IN 1942

R. L. KENNY, B.Sc., F.I.C.

THE CHIEF changes which have taken place in the confectionery industry during the past year have mainly concerned themselves with its adaptation to meet the requirements of the war effort, and at the same time to render every possible service to the public.

Price Control

Price control was already under way at the commencement of the period under review. As far as the retailer was concerned, however, it did not become fully operative until the middle of January, after which date is was illegal to retail at more than 1s. 8d. per lb. goods which had not been classified by the Wartime Confectionery Association. It was unfortunate that there should have been such a long interval between the announcement of the scheme and its complete operation, because the interim period lent itself to the exploitation of a black market.

After the scheme had been in operation some little time, the general verdict was that it had eliminated a profiteering element from the industry, but this achievement in itself was not sufficient. The opinion in knowledgeable circles suggested that rationing would have to be introduced because price control did not make it easier for the public to obtain confectionery, and that unfair distribution would be inevitable unless something more was done. A definite tendency had developed for " under the counter " sales to regular customers which was annoying to the more casual, but nevertheless genuine, type of consumer. The Ministry of Food at this stage, however, had made it quite clear that there was no immediate prospect of rationing being introduced.

Man-Power and Factory Space

Pressure has been brought to bear on the industry in order that a scheme might be formulated for the release of man-power and factory space. To summarise the details, it is sufficient to mention that the chocolate trade was expected to limit its production to Slab Chocolate, Filled Bars and Enrobered Count Lines. This policy was based upon the sound theory that variety in manufacture of foodstuffs usually involved increased labour. Manufacturers were called upon to make a return showing the labour employed, space occupied and chocolates produced. Factories had to limit the labour employed on output to a maximum of five workers per ton per week.

This restriction automatically prevented manufacturers from producing variety in confectionery, since mass production was the only means which they had available to come within the ruling concerning the quantity of confectionery produced by one individual worker. There is no doubt that this regulation was of great value to the war effort, and the industry was appreciative of the principles which had necessitated its introduction. The chief sufferers were the higher-class confectionery manufacturers, since their existing plant was not in the main adapted to mass production, and they had concentrated almost entirely in former years on variety to promote a quality angle. It required a great deal of reorganisation and adaptability on their part to be able to contribute wholeheartedly to this proposal.

Introduction of Rationing

The next stage in the consumer control of chocolate and confectionery was the introduction of rationing. Previously the distribution of sweets had been causing much concern because demand was well in advance of the supply, and traders had difficulty in maintaining equable supply. As soon as the announcement concerning rationing was publicised by the Ministry of Food, the first reaction of the retailer was to reserve supplies so as to have as large a stock as possible on the opening day of rationing, and thus to ensure an adequate renewal of stocks. The tendency even went further than this, because some retailers accumulated as many best-selling lines as possible for the ultimate sale against coupons. In view of this attitude it was inevitable that the time lag between the official announcement and the enforcement of rationing would be much criticised. The Ministry were fully aware of the possible dangers of unfair distribution which would have arisen had retailers been able to take advantage of a scheme which allowed such a loophole. It did not at first announce any details, but merely directed that it would not be to the retailers' benefit to hoard confectionery in this manner.

In order to ensure, however, that there was an adequate reserve of stock to meet coupon requirements, all manufacturers were instructed to label 25 per cent. of all their despatches with a special reserve label, which stipulated that the stock must not be sold until after the rationing period commenced. This instruction was ordered to cover deliveries made in a two-monthly period prior to the advent of rationing.

The public were somewhat shocked when it was announced that the initial ration was only to consist of 2 ozs. per head per week. The retailers were also surprised because those who had reserved stocks in excess of the stipulations of the Ministry found that confectionery which might very well have been sold in previous weeks was now hanging fire. The Ministry, however, were ensuring that all shops were adequately stocked to meet the initial demand, and it was considered likely that an increased ration might be forthcoming in the very near future.

In actual practice, although the ration was increased for a temporary period of eight weeks to 4 ozs. per person per week, the final decision rested at 3 ozs. per week. There is a very sound reason why this quantity is likely to remain for some considerable time. In the

first place, there have been certain reductions on the raw material allocations, with the result that a ration of 3 ozs. per week is the maximum which production will allow, and distributors now know that in future they will get supplies no greater than is necessary to meet this ration.

Rationing of confectionery has now been given a fair trial, and taken by and large it has succeeded extraordinarily well. An interesting point which it emphasised was that the day when anything would sell, no matter how poor in quality, has disappeared, greatly to the advantage of the confectionery industry. In other words, a buyer's market had been created for the public and they were now in a position to discriminate in their choice of purchases. Manufacturers of quality products could not help feeling satisfied in a situation such as this.

Zoning

Towards the end of the year a zoning scheme was scheduled to operate, but was eventually postponed indefinitely. For this scheme the country had been divided into four zones, which would save petrol and manpower. Difficulties, however, have been experienced, because whilst it is a comparatively simple matter to zone products prepared by several manufacturers, it is a much more difficult task to treat in the same manner firms making a variety of different products such as chocolates, toffees and boilings. Also, the concentration of the manufacturing side of the industry has been taking place over a fairly long period of time, and this in itself is an operation which would tend seriously to interfere with the development of the zoning arrangements. The position at the moment is that although a zoning scheme has been drawn up it stands in abeyance until circumstances may permit its introduction.

Technical Developments

The disappearance of natural emulsifying agents has been one of the difficulties which have confronted the industry. Reference is made chiefly to liquid eggs and liquid milk. Although these two ingredients were invaluable from their flavour point of view, they served a very important additional purpose as emulsifying agents. Milk, indeed, is one of the finest natural emulsions available. The emulsifying properties of egg were, of course, due to the presence of lecithin in the yolk, and although spray-dried whole egg is still available, it has been found by experiment that, since the original emulsion has been destroyed by the drying process, subsequent reconstruction does not produce such perfect homogenisation when utilised in confectionery products. As a result, the use of lecithin has become increasingly important, and its invaluable property of reducing viscosity of fats and at the same time increasing their emulsification has been fully exploited. The only drawback in the use of lecithin is that it in no way acts as a filler, since only a very small proportion is required to achieve its purpose, and consequently bulking agents have still to be found to make up any deficiency. Careful and scientific employment of lecithin, however, has definitely helped to solve several problems which have arisen as a result of the total withdrawal of both milk and liquid eggs.

Pectin has also become increasingly important in the preparation of fruit confectionery, since in view of the sugar restrictions it has been necessary to produce certain jams with a slightly lower solids content than was normally the case. The use of pectin in conjunction with controlled acidity and the presence of buffering agents has been instrumental in providing thickening and jellying properties, in order to compensate for the lowering of the full fruit standards of various jam products.

These two examples have been quoted as illustrating the employment of certain ingredients, which are scientifically added in very small proportions, in order to make the maximum use of the restricted range of standard raw materials which are available to the industry.

Allocation of Raw Materials

The main raw materials have, of course, been controlled on a basic allocation principle throughout the year. Sugar, glucose and fats have been severely restricted, but cocoa fortunately has appeared in fairly good supply. Naturally, the only variety available has been West African, which, of course, is the cheaper grade, and as a result manufacturers for the most part have had no alternative but to utilise this type of bean in their recipes. As it was the practice in quality chocolate in pre-war days to blend together several types of high-quality beans mainly indigenous to South America, it will be appreciated that it has not been possible to submit the same quality cocoa flavour as in former years.

Flavouring Materials

Flavouring is so very closely linked with production of confectionery that a few words on the supply position would appear necessary. The closing of the Mediterranean caused most of the citrous essential oils to be in very short supply, and as a result the market price of these commodities rose to a very high level. No price control was introduced, and manufacturers were very short of first-class citrous flavours. Towards the end of the year, however, the Government imported essential oils on a lease-lend basis, and these are to be allocated to the industry. The importation of vanilla bean was at one time extremely small and consisted almost entirely of small parcels offered through the Admiralty Marshal from captured prize cargo. The acquisition of Madagascar eased the position somewhat, and it has been possible to obtain a first-class Bourbon type of bean through importation from this island.

Summary

In summarising the results achieved over a difficult period of time, it can be stated that the Ministry of Food has allowed as large a measure of self-government in the industry as was possible, and this policy has been carried out by manufacturers wholeheartedly. When, however, questions such as concentration of the industry and utilisation of man-power arose, which questions are so vitally linked with positions existing in certain areas, it was necessary for the Government to legislate to the industry directly.

There is no doubt that the directions of the Government have been very severe indeed, but compatible with the policy of a total war effort. Manufacturers for their part have sensed this spirit of determination and appreciated the necessity for its introduction to harmonise with the vital national needs.

The Biscuit Industry

PROGRESS IN 1942

D. M. FREELAND, F.I.C.

IF BREAD is the staff of life, biscuits could be considered as the hard core of the staff, for they are a form of concentrated bread to which have been added ingredients which serve to enhance the food value and give qualities of distinction and flavour.

Energy Values

Some figures for the energy values of biscuits are given in the following table taken from *Chemical Composition of Foods* (McCance and Widdowson). They must be considered as averages, as they do not apply specifically to any particular make :

	Calories Per 100 Gm.	*Calories Per Oz. (Avoir.).*
Wholemeal bread	229	65
Digestive biscuits	505	143
Semi-sweet, like Marie and Osborne	465	132
Chocolate, plain	562	160
Chocolate, milk	561	159
Chocolate biscuits, half coated	522	148
Chocolate biscuits, fully coated	533	152

The extra value of chocolate-coated biscuits is apparent from this table. The public had learned the value of chocolate biscuits long before the war commenced, but up to the commencement of the war there remained a large section of the community which regarded biscuits not as a food, but as a delicacy or an extravagance. In the times of extensive air raids many of these resorted to public shelters and discovered what compact and comforting foods biscuits and chocolate were. The acute shortage of both, during and following the heavy blitz period, is to some extent explained by the heavy demands for them, demands which soon depleted the existing stocks in store and warehouse.

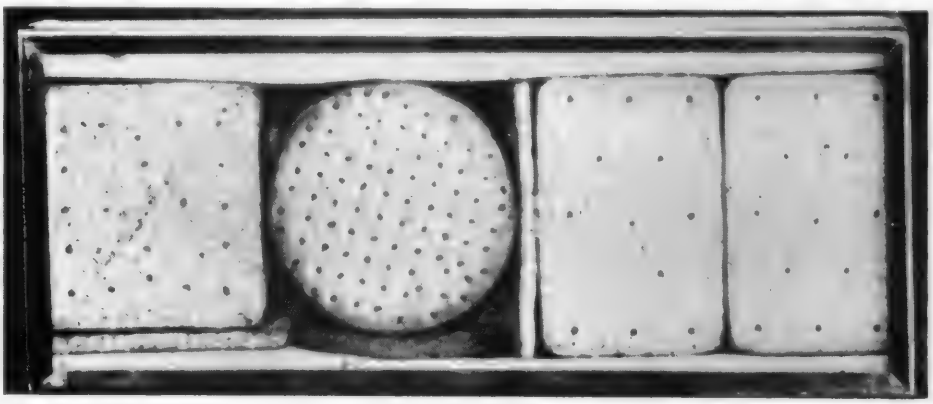
The value of biscuits as a food concentrate with good keeping qualities has, of course, been long established by those responsible for the dietary requirements of the armed forces, the Navy and expeditions of discovery. Indeed, in the first instance biscuits originated as a device for the bread of seamen during the long voyages taken under sail. Bread was baked twice, sometimes four times, for this purpose.

Biscuits as "Service" Rations

The present conflict has not derated the food value of biscuits, or chocolate for that matter, for most plants in the country are busily engaged in production for the Navy, Army, Air Force, Civil Defence Services and for emergency storage pending distribution in areas stricken by renewed air attack or by invasion. Such " Service " biscuits (it is surely not wise in these days to continue the term " iron rations ") are dainty compared with the British Army or ships' biscuits of the past. The general size and form may be gathered from the illustration. Usually they are thin, rectangular in shape, and each weighs about half an ounce. They are packeted in parchment paper, each packet containing twelve biscuits. The circular type has been canned for use in tropical campaigns, in order to reduce spoilage by sandstorms or by the ravages of insects. As with other materials supplied to the Government, they conform to formulæ and specifications submitted prior to manufacture. These are designed to protect the nutritional value. For example, the *p*H of the dough has been specially considered, in order that the vitamin B_1 present in the cereal ingredients is not impaired seriously. In the biscuits taken from a random packet a typical figure is 0·9 I.U. per gram of vitamin B_1, as determined by the thiochrome method.

Cuts in Raw Materials

There is no doubt that with the curtailment in supplies of many of the essential ingredients of biscuits, and with so much of the productive capacity of the plants occupied in producing biscuits for Service needs,



"... . Service biscuits are dainty compared with the British Army or ships' biscuits of the past."

the industry has had to contend with many serious setbacks. Ingenuity and improvisation have combined to override many of the difficulties, but the future forebodes other cuts in materials or labour which, if exercised, would certainly result in lack of supplies of biscuits to the public.

The restrictions already in being have had very serious repercussions upon the industry, and it has responded magnificently to the demands made upon them in the national interest.

Economy Measures

These have resulted in considerable economies. Prior to the war the packing of biscuits into cartons, each with three or four different paper wrappings and sealings, was becoming familiar. Such packings were thought to be airtight and to keep the biscuits in a better condition, though the actual results were largely illusory. When war came these "extravagances" were soon discarded, and the tin returned to its former supremacy in packing, though not again to be adorned with the artistic litho labels of old—just a plain paper sealing band has now to suffice.

When the tinplate situation became serious because of the events in the Far East, further economies and restriction in the use of tin had to be considered and met. The whole basis of biscuit deliveries was overhauled. District zoning and delivery pools were established. Empty tins were returnable to works in a zonal area upon a "common user" principle. These measures saved many thousands of transport miles, with corresponding conservation of fuel.

Reduction of Varieties

Before the war it was common to find about two hundred different kinds of biscuits named in a manufacturer's list, while at present no manufacturer is permitted to make more than sixteen kinds, and many are making less than this number. The cautious manufacturer has curtailed the production of some of his speciality lines for the "duration", lest the consumer should notice any change which might arise in distinctive quality or flavour normally associated with them, as, for example, changes in ingredients necessarily imposed by the war, like the change from white flour to the 85 per cent. National Wheatmeal flour.

Nevertheless, despite the difficulties which have faced the industry, there has been an enormous output of biscuits since the war commenced. Last June the Cake and Biscuit Manufacturers' Wartime Alliance announced that 39,200,000,000 biscuits were consumed during the previous twelve months.

Basic Ingredients

It may be of interest to review some of the developments which have occurred in the making of biscuits consequent upon the restrictions in the supplies of basic ingredients. Fortunately, the whole-hearted co-operation of the flour millers resulted in sufficient supplies of flour coming forward, but sugar was rationed from the beginning of the war, and changes in formulæ for biscuits and for chocolate were made in order to effect economies. Sugar rationing included the control of other sweeteners like golden syrup, treacle, invert sugar and corn syrup, all ranking as secondary sugars to the industry. A little later on the different starches were controlled. Then came the sugar substitutes, mainly based on saccharin or dulcin, and with them the hopes that they would assist to solve the sweetening problems of the harassed biscuit manufacturer. Ingenious as many of these substitute combinations were, few satisfied the essential feature of sugar bulk required by a biscuit dough.

The Fat Problem

In the early days of the war fats presented another set of problems to the manufacturer. When control commenced, fats were pooled and placed in a few specific categories. Upon each of these certain percentages of the normal requirements could be obtained. The fats hoped for were not always forthcoming. As it was most desirable that quality should be maintained, it became necessary to match the fats available to simulate the characters of those in short supply. This threw a new burden on the technical staffs.

The problem was not always so simple that the mere substitution of the equivalent weight of a different fat provided a solution. Often a biscuit of markedly altered character results by differing the nature of the fat used, although the quantity present is similar. There is possibly a relationship between the degree of unsaturation of a fat and its capacity as a shortening agent. It is not suggested that this is the ultimate reason for differences in results, but there is some practical evidence that a loose chemical combination exists between fats and cereal proteins.

As time advanced, the regularity of supplies improved, though quantities in many instances lessened. Nevertheless, much praise is deserved by the officials, who had to undertake the immense task of supplying edible fats to the food-producing industries, each with specific demands to be satisfied.

Dairy Products

Dairy products usually enter into the composition of biscuits. Cheeses and milk—liquid, condensed or dried, full cream or separated—contributed valuable modifications to doughs and enhanced food values to a considerable degree. When held stocks departed, little or none came forward to fill the gaps, and for a short period milk in every form was banned. Later, with lease and lend supplies from the U.S.A., a concession permitting the use of a certain quantity of dried separated milk was made, which greatly assisted the growing task of maintaining quality and provided some easement to the sugar difficulties.

Baking Chemicals

As the war progressed the supplies of baking chemicals tended to become scarcer. This scarcity was principally associated with the aeration agents derived from phosphoric and tartaric acids. With the collapse of France the position of supplies of cream of tartar rapidly worsened, and manufacturers who had been accustomed to use tartaric and soda mixtures sought alternatives. In the ordinary way of things the task was not very difficult. Indeed, many aeration agents, some with superior gasification powers, had been suggested or patented before war commenced, examples being adipic acid, acid lactates, gluconates and hydrogen peroxide. As an instance, adipic acid was said to

yield a CO_2 figure of 60·3 per 100 gm. against 58·7 gm. for tartaric acid and 23·4 gm. for cream of tartar and sodium bicarbonate. Because the raw materials for many of such baking chemicals were earmarked for more essential war needs, manufacture of most of these substances was impossible. In this connection, too, it is obvious that regularity of supplies coming forward, coupled with cost, are important considerations when changes are contemplated.

Citric Acid

The use of acid salts of citric acid may prove to be the salvation of present, and perhaps future, hardships in supplies of acid leavening materials. Citric acid is produced by the growth of certain moulds upon suitable media, and the industrial mycologist is fast becoming acquainted with the life-habits of new and old species of moulds growing under controlled conditions with relation to media and temperatures.

The fact that " austerity " biscuits are the only types available for purchase at present implies that many of the agents for flavouring—spices, essential oils and essences—have largely been relegated by the industry until normal times return. Such ingredients found their main purpose in the manufacture of sweetened decorative and fancy kinds, which have long since disappeared from view. Flavouring agents seldom found employment in the quality types of plain or semi-sweetened biscuits containing first-class ingredients which supply their own distinctive qualities of flavour to the finished article. As " good wine needs no bush ", there should be no desire to cover good butter in a biscuit with a butter flavour.

National Wheatmeal Flour

The factor which has contributed the major change in the appearance of biscuits in wartime is the introduction of 85 per cent. extraction National Wheatmeal flour for white flour. When the change was first put into operation it seemed that biscuits would be of a coarse wheaten character and that only those of a wheaten or digestive type would pass muster. Such fears were not entirely unfounded, for the change was as much an upheaval to the regularised systems of the flour miller as to the users of his product. With early deliveries no two mills seemed to be acting alike in production, and the resultant biscuits were definitely bran-spotted and nettled, despite the concession that 25 per cent. of white flour could be used until existing stocks were finished. Needless to say, flavour as well as appearance suffered, and a darker hue was imparted throughout the biscuits. In the author's view, the branny layers of the wheat in the grist are responsible for the deterioration in flavour.

Mixing Processes

Because of the introduction of National Wheatmeal flours to the doughing-room, some adjustments had to be made in mixing procedures. The presence of branny particles caused a definite increase in absorption in all strengths of flour used and slightly increased the time for development of the doughs. Correspondingly, the tenacity of the mixings was reduced, this feature being more in evidence with flours having the higher protein content.

In normal times, with white flour in use, little definite knowledge was available concerning the effects of granularity of the flour upon the nature of the biscuits made with it. The 85 per cent. extraction flour has brought this aspect more to the front, and the type of biscuit in production remains the criterion upon the issue of the best degree of milling. Large bran particles produce a better-coloured product internally, though upon the surface of the biscuits the bran is conspicuous to vision; finely ground offals yield a darker product upon break, but present a surface with an almost unblemished appearance to the casual observer. However, fine grinding is conducive to slight differences in absorptive capacity which do not create major difficulties in manipulation when once they are established.

It is evident that the flour now in use is the principal cause of the present wartime flavour of biscuits. To consumers possessed of a discerning palate there is an advantage to be gained in eating the biscuits in as dry and crisp condition as possible. The substitution of the desiccator of the laboratory, with fused calcium chloride as a drying agent, for the biscuit barrel, so common an adornment of a sideboard, can be firmly recommended as an aid in this direction.

English Wheat

In conclusion, is it possible to look ahead—to weigh the chances of survival for the duration of the war of an important national industry? There is one extremely hopeful factor. English wheat flour is admirable for biscuit making, but it is notably weak for the production of good loaves of bread, unless blended as a buffer to the relatively strong flours from imported wheats. As part of the nation's expanding agricultural policy, more wheat has been grown, and, Nature proving bounteous, a bumper harvest has been gathered this year. Thus there should be no lack of the basic raw material for the biscuit industry, and it should be possible for everyone to obtain, without restriction, the compact food values associated with biscuits. Manpower and labour problems seem to be the most serious handicap to the industry.

Campden Research Station

In his introduction to the Annual Report for 1941 of the Fruit and Vegetable Preservation Research Station, Campden, Mr. F. Hirst, the director, points out that most of the regular research work has been confined to nutritional problems of interest to canners and of value to the Ministry of Food. The station has been responsible for the supervision of the Fruit and Vegetable Canning Order.

Accounts are given of research and experimental work connected with Hydrogen Swells, Bottling of Vegetables, *Byssochalmys Fulva* and the Canning of Victoria Plums. There is a valuable progress report by W. B. Adam on Factors Affecting the Vitamin C Content of Canned Fruit and Vegetables and another by W. B. Adam and G. Horner on the Effect of Blanching on the Nutritive Value of Canned Vegetables.

Adam and Stanworth have written a paper on the Physical Changes occurring during the Blanching of Vegetables, and experiments on the Ripening of Plums by means of Ethylene are described by Adam and Gillespy.

THE OXIDATION OF STARCH

In the two previous parts of this article, published in the September and November issues, oxidation in acid and alkaline media was discussed. After the concluding part, below, a comprehensive list of the literature is given for further study.

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3. OXIDATION OF STARCH IN NEUTRAL MEDIA

Acid or alkaline hydrolysis and enolisation would be expected to be eliminated in a neutral solution so that oxidation, then, should not be complicated by these other reactions and the study of its mechanism should be simplified.

Oxidation by Bromine

Franchimont[67] found no reaction when dry bromine and dry starch were brought together in chloroform. Syniewski[227, 228] oxidised amylodextrin by means of bromine in the presence of barium carbonate. The amylodextrin had been prepared by autoclaving starch paste for 12 hours at 125-138° C. When the iodine colour disappeared, the oxidation was stopped by removal of the excess bromine.

Felton, Farley and Hixon,[57] oxidised starch paste with increasing amounts of bromine in the presence of calcium carbonate and recovered the calcium salts of the oxidised starch. The calcium content of the oxidised starch underwent a steady increase proportional to the amount of bromine used. The reducing power of the oxidised starches passed through a maximum at two equivalents of bromine, then decreased proportional to the amount of bromine used.

Using amylose and amylopectin prepared by electrodialysis from corn-starch paste practically the same product was obtained, although the oxidation of the amylopectin took four times as long as that of the amylose.

Fink and Summers[80] electrolysed starch in a solution containing potassium bromide and calcium carbonate but observed no reaction. Kihara[134] also oxidised starch paste with bromine and calcium carbonate. His observations were that the oxidised starch was precipitated by calcium or barium hydroxides and that takadiastase scarcely hydrolysed the product.

Oxidation by Iodine

When Andrews and Goettsch[1] heated starch at 100° C. with 2·3 equivalents of iodine in the presence of calcium carbonate, 110 hours were required to reach the achroic point. This same stage was reached in 65 hours in the absence of calcium carbonate.

Conclusion

From what has been said in these articles it would appear that a number of different methods can be used to oxidise starch and that many of these are worth re-examination from the point of view of the manufacturer rather than the academic standpoint. Many of the early workers carried their oxidations to excess and thereby destroyed what might have been commercially valuable intermediate products, and a number of these oxidations carried out in a much milder manner might well produce interesting products. It would be unwise not to re-examine some of the processes because the chemicals used appear to be uneconomic, for, if valuable products are obtainable with little-used chemicals, the demand for the latter may well bring their price down to a level competitive with other cheap oxidising agents at present in commercial use.

It is hoped that this article has achieved its object in arousing some interest in oxidised starch, in drawing attention to the many ways in which the oxidation can be brought about, and in providing a reasonably complete bibliography on the subject. In a number of instances it is not necessary to separate the oxidised starch. In the hydrogen peroxide oxidation an adhesive maker, for example, at the end of the reaction can heat up the batch, add other necessary chemicals, and after mixing discharge and pack the finished adhesive paste. The manufacture of dry mixes by the addition of sodium perborate, Activin and other agents gives products which save on carriage and packing expenses, and when the starch is made into a paste by the user the modification takes place in the cooking kettle.

REFERENCES

1. Andrews and Goettsch, *J. Am. Chem. Soc.*, 1902, **24**, 865.
2. Angelescu and Mircescu, *Bul. soc. chim. Romania*, 1930, **11**, 81; *Chem. Abstr.*, 1930, **24**, 2913.
3. Bailey, "Chemistry of Wheat Flour," pp. 212, 220 *et seq.*, New York, 1925.
4. M. Bamberger and J. Nussbaum, *Monatsh. Chem.*, 1919, **40**, 411.
5. Baudisch and Deuel, *J. Am. Chem. Soc.*, 1922, **44**, 1585.
6. Bechamp, *Compt. rend.*, 1854, **39**, 653.
7. Bergmann and Ludewig, *Ber.*, 1924, **57**, 961.
8. C. Bergquist, E.P. 294,979, 1928; *Chem. Abstr.*, 1929, **23**, 2065.
9. U.S.P. 1,851,749, 1932.
10. U.S.P. 1,871,027, 1932.
11. Berl and Butler, *J. Soc. Chem. Ind.*, 1910, **29**, 373T.
12. Berl and Smith, *ibid.*, 1908, **27**, 534T.
13. Bernardi, Ital. P. 126,803, 1913; *Chem. Abstr.*, 1915, **9**, 2160.
14. Biedermann & Jernakoff, *Biochem. Zeit.*, 1924, **149**, 309.
15. Bielecki and Wurmser, *ibid.*, 1912, **43**, 154.
16. Bochskandl, U.S.P. 2,070,576, 1937.
17. Braconnot, *Ann. chim. phys.*, 1833, (2) **52**, 290.
18. Bräutigam, *Pharm. Ztg.*, 1901, **46**, 636.
19. O. Bredt, G.P. 156,148, 1904; *Chem. Zentr.*, 1905, **I**, 643; E.P. 22,370, 1903.
20. Brooks, U.S.P. 779,583, 1905.
21. Brown, *J. Biol. Chem.*, 1936, **113**, 417.
22. Brown and Millar, *J. Chem. Soc.*, 1899, **75**, 286.
23. —— *ibid.*, 1899, **75**, 307.
24. —— *ibid.*, 1899, **75**, 315.
25. Bryant, U.S.P. 1,937,543, 1933.
26. Buchsweiler Akt.-Ges., *Administration der Minen*, G.P. 227,606, 1910; *Chem. Abstr.*, 1911, **5**, 2200.

27. Busch, Clark, Genung, Schroeder and Evans, *J. Org. Chem.*, 1936, **1**, 1.
28. Caldwell and Hixon, *J. Biol. Chem.*, 1938, **123**, 595.
29. L. Cerf., U.S.P. 698,632, 1902.
30. Chakrabarti and Dhar, *J. Indian Chem. Soc.*, 1929, **6**, 617.
31. Chemische Fabrik Gedeon Richter Akt.-Ges., 544-693, 1932; *Chem. Abstr.*, 1932, **26**, 3518.
31A. Corn Prod. Ref. Co., E.P. 534,503, 1939.
32. J. Craik, *J. Soc. Chem. Ind.*, 1924, **43**, 171T.
33. C. F. Cross, E. J. Bevan and C. Beadle, *Ber.*, 1893, **26**, 2520.
34. David, U.S.P. 769,061, 1904.
35. Debuigne, 777,722, 1935; *Chem. Zentr.*, 1935, **II**, 140.
36. De Chalmot, *Am. Chem. J.*, 1895, **17**, 535.
37. De Gassicourt, *Beitr. Chem. Physik.*, 1812, **1**, 1; after Walton, ref. 236.
38. Deutsche Maizena, G.m.b.H., 771,029, 1934; *Chem. Abstr.*, 1935, **29**, 952.
39. —— F.P. 844,571, 1939; *Chem. Abstr.*, 1940, **34**, 7648.
40. —— F.P. 844,572, 1939; *Chem. Abstr.*, 1940, **34**, 7648.
41. Dhar, *J. Phys. Chem.*, 1924, **28**, 943.
42. Döbereiner, *Ann. Physik Chem.*, 1829, **15**, 307.
43. Dollfus & Scheurer, *Bull. soc. ind. Mulhouse*, 1896, **66**, 241.
44. Doroschewski and Rakowski, *J. Russ. Phys. Chem. Soc.*, 1907, **39**, 427; *Chem. Zentr.*, 1907, **II**, 1325.
45. Dubeau, MacMahon and Vincent, *Am. Dyestuff Reptr.*, 1939, **28**, 590.
46. Duintjer Wilkens Meihuizen and Co., 772,836, 1934; *Chem. Abstr.*, 1935, **29**, 1676; E.P. 420,275, 1935; *Chem. Abstr.*, 1935, **29**, 3546.
47. Dulac and Rosenbaum, " Industrial Cold Adhesives," London, 1937.
48. O. Durrieux, *Bull. soc. chim. Belg.*, 1913, **27**, 90.
49. Eder, *J. prakt. Chem.*, 1879, **19**, 294.
50. Ekhard, *Z. Spiritusind.*, 1926, **49**, 196.
51. Everett and Sheppard, " Oxidation of Carbohydrates in Acid Solution," p. 43, University of Oklahoma School of Medicine, Oklahoma City, 1936.
52. Farbenfabriken, 383,902, 1907; *Chem. Abstr.*, 1909, **3**, 1105.
52A. F. F. Farley, in " Starch and its Derivatives," by J. A. Radley, 2nd ed., London, 1942.
53. Feibelmann, *Z. ges. Textil-Ind.*, 1924, **27**, 410; *Chem. Zentr.*, 1924, **II**, 2702.
54. —— *Melliand Textilber*, 1926, **7**, 144.
55. —— *Am. Dyestuff Reptr.*, 1928, **17**, 436.
56. —— *Indian Textile J.*, 1931, **41**, 317; *Chem. Abstr.*, 1931, **25**, 5774.
57. Felton, F. F. Farley and Hixon, *Cereal Chem.*, 1938, **15**, 678.
58. Fernbach and Wolff, *Proc. Seventh Intern. Congr. Applied Chem.*, 1909, **6b**, 124.
59. Findlay & Rosebourne, *J. Soc. Chem. Ind.*, 1922, **41**, 58T.
60. Fink & Summers, *Trans. Electrochem. Soc.*, 1938, **74**, 625.
61. Fletcher and Taylor, *J. Am. Chem. Soc.*, 1938, **60**, 3018.
62. Flick, G. P. 217,336, 1909; *Chem. Abstr.*, 1910, **4**, 1557.
63. —— E.P. 25,121, 1909; *Chem. Abstr.*, 1911, **5**, 224.
64. R. Fosse, *Bull. soc. chim. France*, 1921, (4) **29**, 158.
65. *Compt. rend. soc. biol.*, 1922, **86**, 175.
66. Fourcroy, " Encyclopédie méthodique de Chymie," **5**, p. 81, Paris, 1792; after Walton 235.
67. Franchimont, *Rec. trav. chim.*, 1883, **2**, 91.
68. J. Frère, *Rev. prod. chim.*, 1924, **27**, 721; *Chem. Zentr.*, 1925, **I**, 722.
69. Friedenthal, *Centr. Physiol.*, 1898, **12**, 849.
70. F. Fritsche, E.P. 1,351, 1908; *Chem. Abstr.*, 1909, **3**, 600.
71. —— U.S.P. 910,524, 1909.
72. Fujita, Maeshima and Hachihama, *J. Soc. Chem. Ind.*, Japan, 1938, **41**, *Suppl. binding*, 63.
73. Fuller, E.P. 383,778, 1933; *Chem. Abstr.*, 1933, **27**, 6006.
74. Fuller, U.S.P. 1,937,752, 1933.
75. —— U.S.P. 1,942,544, 1934.
76. —— U.S.P. 2,014,799, 1935.
77. Gatin-Gruzewska, *Compt. rend. soc. biol.*, 1907, **63**, 224.
78. —— *Compt. rend.*, 1909, **148**, 578.
79. C. Gerber, *ibid.*, 1912, **154**, 1543.
80. —— *Compt. rend. soc. biol.*, 1912, **72**, 1002.
81. —— *ibid.*, 1912, **73**, 356 and 358.
82. Gerson and Sachse, 167,275, 1906; *Chem. Zentr.*, 1906, **I**, 1128.
83. Gorup-Besanez, *Ann.*, 1859, **110**, 86.
84. Grangaard, Michell and Purves, *J. Am. Chem. Soc.*, 1939, **61**, 1290.
85. Gruzewska, *Compt. rend. soc. biol.*, 1910, **68**, 274.
86. —— *Bull. soc. chim.*, 1910, (4) **7**, 744.
87. —— *Compt. rend. soc. biol.*, 1910, **68**, 1084.
88. Guérin, *Ann. Chem.*, 1933, **8**, 24.
89. W. Haake, G.P. 547,421, 1932; *Chem. Zentr.*, 1932, **I**, 2907.
90. R. Haake and W. Haake, G.P. 164,385, 1905; E.P. 19720, 1901; *Chem. Zentr.*, 1905, **II**, 1566.
91. —— —— U.S.P. 813,647, 1906.
92. —— U.S.P. 1,792,088, 1931.
93. —— G.P. 543,457, 1932; *Chem. Abstr.*, 1932, **26**, 2613.
94. Habermann, *Ann.*, 1872, **162**, 297.
95. —— *ibid.*, 1874, **172**, 11.
96. Hachihama and Fugita, *J. Soc. Chem. Ind.*, Japan, 1935, **38**, *Suppl. binding* 744.
97. Hale, *Am. J. Sci.*, 1902, **13** (4), 379.
98. R. Haller, *Melliland Textilber*, 1924, **5**, 389.
99. —— E.P. 229,623, 1925; *Chem. Abstr.*, 1925, **19**, 3169.
100. —— U.S.P. 1,564,955, 1925.
101. —— G.P. 438,119, 1926; *Chem. Zentr.*, 1927, **I**, 1240.
102. —— *Zeit. ges. Textil-Ind.*, 1927, **30**, 416; *Chem. Zentr.*, 1927, **II**, 1902.
103. —— *Kolloid-Zeit.*, 1927, **41**, 81.
104. —— G.P. 665,268, 1938; *Chem. Abstr.*, 1939, **33**, 1988.
105. —— *Helv. Chim. Acta*, 1930, **23**, 596.
106. R. Haller, Hackl and Frankfurt, *Melliand Textilber*, 1928, **9**, 757.
107. —— —— —— *Melliand*, 1930, **2**, 86.
108. C. S. Hanes, *New Phytologist*, 1937, **36**, 101.
109. Hartwig, U.S.P. 798,509, 1905.
110. Harvey, U.S.P. 1,366,653, 1921.
111. —— U.S.P. 2,006,164, 1935.
112. E. Harz, *Wochschr. Brau.*, 1905, **22**, 721.
113. W. N. Haworth, E. L. Hirst and Woolgar, *J. Chem. Soc.*, 1935, **177**.
114. Henkel and Cie, E.P. 289,053, 1928; *Chem. Zentr.*, 1928, **II**, 393.
115. Henzerling, U.S.P. 1,834,057, 1931; *Chem. Zentr.*, 1932, **I**, 1439.
115A. F. Hermite, G.P. 70,275; E.P. 1061, 1892.
116. Hildebrandt, G.P. 545,081, 1932; *Chem. Abstr.*, 1932, **26**, 3135.
117. E. L. Hirst, M. M. T. Plant and Wilkinson, *J. Chem. Soc.*, 1932, 2375.
118. Holste, E.P. 30,390, 1909; *Chem. Abstr.*, 1911, **5**, 2444.
119. Hönig and Ruziczka, *Biochem. Zeit*, 1930, **218**, 397.
120. F. Höppler, G.P. 558,145, 1932; *Chem. Abstr.*, 1933, **27**, 1229.
121. Hough, G.P. 172,549, 1906; *Chem. Zentr.*, 1906, **II**, 938.
122. Int. Pat. Devel. Co., F.P. 657,605, 1928; *Chem. Abstr.*, 1929, **23**, 4591.
123. Jackson and Hudson, *J. Am. Chem. Soc.*, 1937, **59**, 2049.
124. —— *ibid.*, 1938, **60**, 989.
125. G. B. Jambuserwala, *J. Textile Inst.*, 1938, **29**, 149T.
126. G. B. Jambuserwala and K. R. Kanitkar, *ibid.*, 1939, **30**, 85T.
127. —— —— *ibid.*, 1940, **31**, 1T.
128. Kantorowicz, U.S.P. 1,207,177, 1916.
129. J. R. Katz, *Textile Research*, 1939, **9**, 146.
130. —— and Weidinger, *Z. physik. Chem.*, 1939, **A184**, 100.
131. Kerr, U.S.P. 2,052,308, 1936.
132. —— U.S.P. 2,108,862, 1938.
133. Kesseler and Döring, G.P. 535,839, 1931; *Chem. Abstr.*, 1932, **26**, 1150.
134. Kihara, *J. Agr. Chem. Soc., Japan*, 1939, **15**, 107; *Chem. Abstr.*, 1939, **33**, 6253.
135. Kiliani, *Ber.*, 1925, **58**, 2345.

136. H. Kindscher, G.P. 149,588, 1904; *Chem. Zentr.*, 1904, **I**, 976; 168,980, 1906; *Chem. Zentr.*, 1906, **I**, 1514.
137. Kirchhoff, *Tekhnologicheskii Zhurnal*, **9**, pt. 1, 3-26, 1812; *abstracted in Acad. Imp. Sci.*, St. Petersburg, *Mem.*, 1811, (5), **4**, 27.
138. L. König, *J. Soc. Chem. Ind.*, 1894, **13**, 824A.
139. —— E.P. 9,674, 1894.
140. Kühl and Soltau, G.P. 522,555, 1931; *Chem. Zentr.*, 1931, **I**, 3525.
141. G. Langbein, *Pharm. Z. Russ.*, 1868, **7**, 573; *Chem. Zentr.*, 1869, 847.
142. Leconte, *Zeit Elektrochem.*, 1904, **11**, 113; *Chem. Zentr.*, 1904, **II**, 1076.
143. Leiben, *Ber.*, 1875, **8**, 1017; —— and Reichardt, *ibid.*, 1020.
144. Lieben and Molnar, *Monatsh. Chem.*, 1929, **53**, 1.
145. Liebig, *Ann. Physik. Chem.*, 1829, **15**, 541.
146. C. J. Lintner, *Zeit. angew. Chem.*, 1890, **3**, 546.
147. Löb, *Biochem. Zeit.*, 1912, **46**, 121.
148. Lobenstein, *Thesis*, Leipzig; *Chem. Abstr.*, 1931, **25**, 3867.
149. J. R. MacMillan, U.S.P. 1,567,609, 1925.
150. Malaprade, *Bull. soc. chim.*, Mém., 1934, **1**, 833.
151. Mann, Krüger and Tollens, *Zeit angew. Chem.*, 1896, **9**, 33.
152. Massol, *Compt. rend.*, 1911, **152**, 902.
153. Militz, U.S.P. 941,159, 1909; *Chem. Abstr.*, 1910, **4**, 525.
154. Mirow, G.P. 273,235, 1914; *Chem. Abstr.*, 1914, **8**, 2825.
155. Mittra and Dhar, *Zeit. anorg. Chem.*, 1922, **122**, 146.
156. Moissan, *Ann. chim. phys.*, 1891, (6) **24**, 224.
157. Montgomerie, E.P. 490,070, 1938.
158. Mori, Japanese Pat. 100,061, 1933; *Chem. Abstr.*, 1934, **28**, 2564.
159. Myrbäck, *Biochem. Zeit.*, 1936, **285**, 290.
160. Nakamura, *J. Faculty Agr. Hokkaido Imp. Univ.*, 1935, **38**, Pt. 1, 1.
161. D. R. Nanji, E.P. 273,481, 1927; *Chem. Abstr.*, 1928, **22**, 2076.
162. Naquet, *Ber.*, 1892, **25**, 884R; G.P. 64,401, 1892.
163. National Adhesives Corp., F.P. 729,259, 1932; *Chem. Abstr.*, 1932, **26**, 6176.
164. Nef, *Ann.*, 1904, **335**, 191; 1907, **357**, 214; 1910, **376**, 1; 1914, **403**, 204.
165. Neuberg and Miura, *Biochem. Zeit.*, 1911, **36**, 37.
166. Odell, U.S.P. 1,425,605, 1922.
167. Omori, *J. Biochem.*, Japan, 1931, **14**, 339.
168. —— *ibid.*, 1932, **16**, 483.
169. Ono, *Rev. Phys. Chem.*, Japan, 1940, **14**, 25; *Chem. Abstr.*, 1940, **34**, 5721.
170. Paira, E.P. 9,370, 1909; *Chem. Abstr.*, 1909, **3**, 3018.
171. C. C. Palit and N. H. Dhar, *J. Phys. Chem.*, 1925, **29**, 799.
172. —— *ibid.*, 1926, **30**, 939.
173. —— *ibid.*, 1928, **32**, 1263.
174. —— *ibid.*, 1930, **34**, 711.
175. —— *ibid.*, 1930, **34**, 993.
176. J. Pelouze, *Ann.*, 1839, **29**, 38; *J. prakt. Chem.*, 1839, **16**, 168.
177. —— *Compt. rend.*, 1846, **23**, 809 and 892.
178. F. G. Perkins, U.S.P. 1,020,656, 1912.
179. Personne, *J. pharm. chim.*, 1861, (3), **39**, 49.
180. Petit, *Compt. rend.*, 1892, **114**, 1375.
181. Pieper, G.P. 79,326, 1894; *Ber.*, 1895, **28**, 575R.
182. Pierson, U.S.P. 2,023,973, 1935.
183. J. A. Radley, "Starch and its Derivatives," pp. 64 and 68, London, 1941.
184. *Ibid.*, p. 127.
185. *Ibid.*, p. 187.
186. Randall, Benger and Croocock, *Proc. Roy. Soc.* (*London*), 1938, **A165**, 432.
187. Rankin, U.S.P. 1,520, 885, 1924.
188. Rassow, *Melliand Textilber*, 1931, **12**, 468.
189. Rassow and Lobenstein, *Kolloid. chem. Beih.*, 1931, **33**, 179.
190. Reisz, Hungarian Pat. 104,972, 1933; *Chem. Abstr.*, 1933, **27**, 4123.
191. A. Reychler, G.P. 360,128, 1922; *Chem. Zentr.*, 1923, **II**, 40; F.P. 544,580, 1922; *Chem. Zentr.*, 1923, **II**, 1004.
192. A. Reychler, *Bull. soc. chim. Belg.*, 1923, **32**, 221.
193. Richardson, Higginbotham and Farrow, *J. Text. Inst.*, 1936; **27**, 131T.
194. Rodewald and Kattein, *Z. physik. Chem.*, 1900, **33**, 579.
195. M. Samec, *Kolloid. chem. Beih.*, 1929, **28**, 155.
196. —— *Kolloid-Zeit.*, 1933, **64**, 321.
197. M. Samec & M. Blinc, *Kolloid. chem. Beih.*, 1933, **38**, 48.
198. Samec and Jencic, *ibid.*, 1915, **7**, 137.
199. Samec and Ulm, *ibid.*, 1936, **43**, 287.
200. Schaeffer and Scheurer, *Bull. soc. ind. Mulhouse*, 1893 **63**, 363.
201. Schmerber, *ibid.*, 1896, **66**, 238.
202. E. Schmidt and Craumann, *Ber.*, 1921, **54**, 1860.
203. Scholten's Chem. Fabr., E.P. 392,178, 1933; *Chem. Abstr.*, 1933; **27**, 4951.
204. Schotz, E.P. 345,985, 1931; *Chem. Abstr.*, 1931, **25**, 5477.
205. W. Seck, E.P. 437,890, 1935; *Chem. Abstr.*, 1936, **30**, 3270.
206. Semichon and Flanzy, *Compt. rend.*, 1932, **195**, 254.
207. R. S. Shane, *J. Chem. Educ.*, 1937, **14**, 460.
208. Siemens and Halske, *Ber.*, 1893, **26**, 959R; G.P. 70,012, 1893.
209. —— G.P. 103,399 and 103,400, 1899; *Chem. Zentr.*, 1899, **II**, 892.
209A. —— G.P. 88,447; U.S.P. 798,509, 1905.
210. O. A. Sjostrom, Canadian Pat. 356,463, 1936; U.S.P. 2,052,320, 1936; *Chem. Abstr.*, 1936, **30**, 7378.
211. *Société Anonyme Trust Chimique*, G.P. 134,301, 1902; *Chem. Zentr.*, 1902, **II**, 836.
212. Sohst and Tollens, *Ann.*, 1888, **245**, 1.
213. Sollazzo, *Boll. chim. farm.*, 1934, **73**, 917; *Chem. Abstr.*, 1935, **29**, 2924.
214. Sprockhoff, G.P. 618,265, 1935; *Chem. Abstr.*, 1936, **30**, 319.
215. Städeler, *Ann.*, 1847, **61**, 101.
216. Stokes and Peter, U.S.P. 1,870,472, 1932.
217. Stolle and Kopke, F.P. 384,764, 1907; *Chem. Abstr.*, 1909, **3**, 1105.
218. —— G.P. 199,753, 1908; *Chem. Abstr.*, 1908, **2**, 3167; Austrian Pat. 37,835, 37,836 and 40,449.
219. —— G.P. 202,229, 1908; *Chem. Zentr.*, 1908, **II**, 55.
220. C. Sunder, *Bull. soc. ind. Mulhouse*, 1924, **90**, 558.
221. Supf, G.P. 364,314, 1922; *Chem. Zentr.*, 1923, **II**, 257.
222. Sutherland, E.P. 121,943, 1919; *Chem. Abstr.*, 1919, **13**, 1109.
223. Symons and Buswell, *Ind. Eng. Chem., Anal. Ed.*, 1929, **1**, 161.
224. Syniewski, *Ber.*, 1897, **30**, 2415.
225. —— *ibid.*, 1898, **31**, 1791.
226. —— *Ann.*, 1899, **309**, 282.
227. —— *Roczniki Chem.*, 1922, **2**, 83; *Chem. Abstr.*, 1923, **17**, 1627.
228. —— *Ann.*, 1925, **441**, 277.
229. Trotman, *Dyer*, 1928, **60**, 160.
230. Van der Meulen, G.P. 624,988, 1936; U.S.P. 2,053,012, 1936; *Chem. Abstr.*, 1936, **30**, 7378.
231. Vintilescu and Faltis, *Bul. soc. chim. Romania*, 1923, **5**, 59; *Chem. Abstr.*, 1924, **18**, 1475.
232. Von Asboth, *Chem. Ztg.*, 1892, **16**, 1517 and 1560.
233. Von Brueder, U.S.P. 646,724, 1900.
234. Walker, *Am. Dyestuff Reptr.*, 1935, **24**, 374.
235. R. Walton, "Comprehensive Survey of Starch Chemistry," p. 239, New York (1928).
236. —— *ibid.*, p. 2, Bibliography.
237. W. Watson and D. W. Kent-Jones, U.S.P. 1,519,014, 1924.
238. White, E.P. 172,145, 1922; F.P. 525,462, 1921; G.P. 369,971, 1923; *Chem. Abstr.*, 1922, **16**, 1049; *Chem. Zentr.*, 1923, **II**, 1004.
239. Will and Lenze, *Ber.*, 1898, **31**, 68.
240. Wolff, *Compt. rend.*, 1905, **141**, 1046.
241. Wroe, G.P. 231,960, 1900; *Chem. Abstr.*, 1912, **6**, 942.
242. C. Wurster, *Ber.*, 1889, **22**, 145R.

Ice Cream

1942—AND AFTER

ERIC HUMPHRISS, A.I.C., F.R.M.S., F.C.S.

THE WARTIME history of the ice cream industry can be summarised in a sentence or two. First, there was the early prohibition of the use of milk and milk products in ice cream manufacture, except for stocks of certain milk products on hand—a decree which was accompanied by a fairly severe, though equitable, restriction in the quantities of other essential ingredients available. This measure has been followed by the total prohibition of the manufacture of all ice cream, operative since the end of last September.

Reactions of the Industry

The reactions of the industry as a whole to these governmental decrees can be described as biphasic. The first phase following on the prohibition of milk, etc., in ice cream making was one of substitution. This involved considerable work on the part of those engaged on the technical and scientific side of the industry in finding new ingredients and modifying manufacturing technique and processes in order to make the best use of such materials as were available. The results of such works were made known to the industry by the publication of a wartime recipe booklet by the Joint Emergency Committee of the two trade associations, and through articles in the trade journals.

The prohibition of the manufacture and sale of ice cream, ices, etc., by edict of the Minister of Food caused, as might be anticipated, some consternation in the trade, and efforts were made to endeavour to persuade the Minister to reconsider or modify his decision. These efforts were without result, but will probably be pursued. The general reaction appears to be that if this radical step was adjudged to be imperative in the national interest, well and good; though it is a little difficult to see why the same necessary economies could not have been effected by spreading the burden over the ice cream and allied industries, so averting the complete closing down of the ice cream trade.

While admittedly ice cream is a commodity not amenable, by its very nature, to a rigid rationing system, nevertheless uniformity of distribution is largely ensured by the manner of its normal retail sale, and also because of the large number of small, scattered production units which used to make the product, often in modern automatically refrigerated equipment.

Food Value

There are one or two points, viewed in retrospect, which seem worth recording.

The following is an analysis of a genuine ice cream :

Fat	10-14 per cent.
M.S.N.F.	10½ ,, ,,
Sucrose	13* ,, ,,
Stabiliser (about) ...	½ ,, ,,
Total solids (about)...	36 ,, ,,

* Or sucrose 8 per cent. and dextrose 6 per cent.

Such a product is a genuine food, containing as it does protein, fat, carbohydrate and the essential minerals calcium and phosphorus in balanced proportion. It is possible that this aspect might, with advantage, have been urged at a much earlier date in responsible quarters. Had this happened, things might have turned out differently. This line of reasoning also commends itself in regard to other admittedly technical points in relation to the place of ice cream in a wartime dietary.

Basis of Wartime Product

The basis of the wartime *ersatz* product manufactured during the last two years was a malt amylase hydrolysis product of wheat flour, most of the starch being converted to dextrins and to a lesser extent maltose. By this method it was found possible to replace the 10 per cent. or so M.S.N.F. normally present in pre-war ice cream by an equal quantity of hydrolysed wheat flour. To this hydrolysate was added inorganic salts—*e.g.*, phosphates, chlorides, etc.—and, experimentally, calcium salts as well. The wheat gluten was retained so that the aqueous phase of the mix was not all "gum and sugar". But, potentially of greater importance, several other dehydrated vegetable products were tested experimentally as mix ingredients.

The author found, for example, that some 1 per cent. or so of dried carrot flour could, with advantage, be incorporated in wartime ice cream. This product, in addition to being home-produced, enhances to a significant degree the pro-vitamin A content of the mix. One sample examined when incorporated in mix to the above-mentioned degree resulted in the enhancing of the β-carotene content of the mix by roughly 5,000 I.U. per pound. This use of the commodity in question may have been considered of significance, especially in view of the prohibition of the addition of vitamins A and D concentrate to ice cream which was promulgated about a year ago, and also because of the carbohydrate content of carrots.

Use of Potato and Soya

It has also been found possible to incorporate up to 4 per cent. of potato flour in *ersatz* ice cream; the importance of the ascorbic acid so added was not investigated. Early this year rye flour was also tried to the extent of some 5 per cent. The resulting product was adjudged to be as palatable as the product made entirely from wheaten flour, and was certainly not more difficult to handle from the technical point of view. Soya flour to a maximum of approximately 3 per cent. has been wisely used in ice cream with success.

It will be evident from the above incomplete résumé of the experimental work performed on the production of frozen confections—*i.e.*, wartime ice cream—from a

variety of home-produced ingredients that, using a combination of such products, a decidedly nutritious ice cream could be produced containing little or no wheaten flour. Some fat and sugar and/or dextrose is of course essential, although saccharin replaced some one-third of the normal sugar/dextrose content in much of the wartime product.

These and other relevant matters may, or may not, have been regarded as significant by the Ministry of Food in relation to the other economies, such as transport, paper, man-power, etc., which, it was stated, compelled the closing down of the industry for the "duration".

Post-War Standards

Turning to the post-war resurgence of the industry, several matters at once occur to mind as meriting consideration in the interim period of non-production. Probably the most important is the question of a standard for ice cream. The most opportune moment to introduce such an enactment, provided always such legislation did not postpone the reopening date, would undoubtedly be at the end of the war.

Such a standard should secure two things. First, the bacteriological safety and purity of the product, and, secondly, that all ice cream should conform to a chemical standard which would ensure that all ice cream sold would be primarily a product of definite value as a food.

All too often the bacteriological purity and safety of dairy products and even milk are confused. Safety in this regard connotes freedom from pathogenic micro-organisms; purity implies that the product shall contain few live bacteria, and very few or none of specific types whose presence is indicative of careless methods of manufacture, or of the use of ingredients of unsatisfactory bacteriological quality.

Pasteurisation is the only practicable way of securing the degree of safety necessary; and this would involve no hardship on the smaller maker, since he invariably boils his mix at an early stage in its manufacture. It would rule out the production of "cold mixes", a sacrifice that would entail no hardship, as experience in wartime amply indicates.

Bacteriological Purity

To ensure bacteriological purity would necessitate the setting up of a numerical maximum for the Total Colony Count, and the prescribing of methods and conditions for the carrying out of the test. A maximum permissible count of the order of 100,000 bacteria per gram would certainly not be too stringent, and a technique for the Plate Count along the lines of that specified for milk in Memo 139/Foods, Ministry of Health, amended for ice cream in the light of methods set out in *Standard Methods of Milk Analysis*, 6th edition (Amer. Public Health Assoc. and A.O.A.C.), for ice cream, would readily meet the case. A Coliform organism and possibly also a B. Welchii limit might also be usefully set out.

Such statutory bacteriological standards would, coupled with obligatory mix pasteurisation (or severer heat treatment of the mix), provide at once a bacteriologically safe and pure product. Surely no opposition would be encountered from any source in the enacting of these *desiderata*!

Chemical Composition

The prescribing of a chemical standard is more controversial. While some sort of a case can be made out for a low mix fat minimum, and precedents exist in the legislation introduced prior to the war in Northern Ireland and the Isle of Man, surely a fat content of less than 8 per cent. is not worth while. This was the figure that was envisaged in the proposed standard and definition of ice cream adopted many years ago by the Ice Cream Association of Great Britain and Ireland, and, judged by legally established American and European standards, is certainly not too high.

There is little to quarrel about a 10 per cent. milk-solids-not-fat minimum, and, given an 8 per cent. fat and 10 per cent. M.S.N.F. mix, there is no point in setting a minimum figure for the total solids content of the mix.

It is, of course, assumed that the 8 per cent. fat would be all milk (or butter) fat. The difficulty from the analytical point of view of estimating milk (or butter) fat in the presence of other fats is the weightiest argument advanced against the permissive use of such fats to augment the total mix fat content over and above the presumed 8 per cent. milk fat minimum.

Following established precedent, the mix would, of course, be compounded from a mixture of any edible dairy products, including: full-cream milk, skim milk, cream, concentrated or desiccated milk products, butter, butter fat and water.

There is litte point, with a standard such as is outlined above, in making special provision for fruit and nut ice creams, as is common in State standards in the U.S.A., although, of course, water ices devoid of fat would have to be specially recognised in any contemplated legislation.

Food Solids per Gallon Standard

Finally, there is the contentious question of a "Food Solids-per-Gallon" standard. A standard which limited the overrun in ice cream to not more than 100 per cent., corresponding to a weight of roughly $5\frac{1}{2}$ lb. per gallon of finished ice cream, is desirable and all that is necessary. While admittedly such a factor does not necessarily exactly measure the "Food Solids per Gallon", the ease with which such a standard could be enforced, coupled with the technical considerations involved, would provide the degree of control of overrun that is required.

Such, then, are the matters, past, present and future, which are, or should be, exercising the minds of ice cream manufacturers during such moments as they may be able to spare from more pressing wartime activities.

"FOOD MANUFACTURE" 1942 INDEX

THE 1942 Index of FOOD MANUFACTURE will shortly be ready and copies will be available to subscribers on receipt of a stamped addressed envelope.

It is recommended that the envelope be 10 inches by 8 inches to avoid undue folding of the Index.

Correspondence

The National Bread

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—The pleasure is mine—the pleasure, that is, of being instructed by my friend Mr. T. H. Fairbrother in the always somewhat Eleusinian mysteries of milling economics. But unfortunately (for you, sir, at any rate, if not for Mr. Fairbrother) I remain quite unconvinced. To make clear why, a little recapitulation is unavoidable.

What did Mr. Fairbrother say in 1941 (FOOD MANUFACTURE, **16,** 139)? In order to absolve the millers from the charge that they " were exploiting the public and foisting white bread on them to the millers' own pecuniary gain " (Fairbrother, *loc. cit.*, 1941, **16,** 185), he produced figures that showed the amounts received by the miller for 100 cwts. of wheat, according as it was milled whole, at 85 per cent. extraction or at 75 per cent. extraction, when he sold the results of his milling at current prices. He concluded that the miller " would actually get £2 5s. 6d. more if he sold his wheat at 100 per cent. wholemeal than as 75 per cent. white flour and 25 per cent. offal ", and added, with characteristic pugnacity, " These facts speak for themselves."

Perhaps they do, but is it the truth they speak, or at any rate the relevant truth? When challenged by me on this point in August, 1941, Mr. Fairbrother was silent, because, he says in October, 1942, after I had repeated my question, " it seemed so obvious ". It is, indeed, so obvious that Mr. Fairbrother himself now says that " the public will probably not eat 100 lbs. of wholemeal against 70 lbs. of white " (*loc. cit.*, 1942, **17,** 295). In other words, the comparison made by Mr. Fairbrother in June, 1941, when he chivalrously leapt to the defence of the libelled miller, is quite irrelevant to the point at issue.

Mr. Fairbrother now changes his ground—with such deftness that it may escape notice by those who underrate his polemical skill. He now agrees that the miller will only mill 70 lbs. of wheat where he formerly milled 100 lbs. This, he tells us, will reduce his labour and power charges. Note—he omits to point out that it will simultaneously reduce his output, his turnover and, presumably, his profits. I say presumably because I do not believe that the millers, amongst the shrewdest of all our industrialists, normally run their businesses at a loss or even at cost price. Milling is indeed a mysterious, not to say an unintelligible, trade if in such circumstances its leaders welcome a reduction in output, turnover and profit, and quite unlike any other trade I have encountered.

Your readers are hardly in danger of being misled by Mr. Fairbrother's very unconvincing alternative programme for the milling trade—that the miller should continue to buy 100 lbs. of wheat as before, mill 70 lbs. of it as whole meal and resell the residual 30 lbs. of whole wheat, presumably to be ground somewhere else for pig feeding or to be fed as such to poultry, pigs or cattle. (Note that *I* never said animals do not consume whole wheat; I merely remarked that cattle can't be fed on wholemeal flour.)

In other words, the miller is to incur the handling charges for 30 lbs. of wheat out of every 100 lbs. that he acquires, and then to resell it—obviously at a loss, for his potential customers are not likely to pay him more for it than they would pay his supplier if they went to that supplier direct!

It is clear, then, that increasing the extraction of flour means a reduced turnover for the miller. He patriotically accepts this share of the national sacrifice in wartime, his patriotism doubtless reinforced by Statutory Orders that make it an offence for him to take any other course. But Mr. Fairbrother has still failed to produce an answer to those who loudly maintain—and I am not one of them; all I have done is to ask for the facts—that the millers have a financial interest in preventing any rise in the extraction of flour.

Yours faithfully,

A. L. BACHARACH.

26, WILLOW ROAD,
HAMPSTEAD, N.W. 3.

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—In the above letter Mr. Bacharach accuses me of attempting to mislead your readers and suggests that my words do not speak the truth. I am content to let your readers pass judgment on that. From such comments as I have heard on this correspondence, I shall not be afraid of the verdict.

Talking about veracity, I think Mr. Bacharach might read my words more carefully. I can only assume it is careless reading, as I should not like to accuse Mr. Bacharach of trying to mislead your readers. In the third paragraph from the end of his letter he talks about my " unconvincing alternative programme for the milling trade ". I made no such suggestion. I said: " *If by any chance* he (the miller) had bought 100 lbs., he only needs to grind 70 lbs. of it and resell his remaining 30 lbs. as wheat not wholemeal ". Can anyone in his senses and capable of reading plain English interpret that as a suggested programme? Surely the words " *if by any chance* " suggest a possible get-out from an unfortunate position. Certainly after the first 100 lbs. had been disposed of the miller would then only buy the 70 lbs. he needed to meet his output.

Mr. Bacharach flatters me by attributing to me polemical skill, but he fails to throw dust in my eyes, and his skilful manipulation of the red herring does not seduce me from the trail. He asks one relevant question only in his long letter—the last sentence: " Have the millers a financial interest in preventing any rise in the extraction of flour?" Speaking as a chemist (a profession usually associated with accuracy and truth-seeking) and not as a miller, my answer is " No ", and I refer Mr. Bacharach again to the last paragraph in my letter in your October issue, and again ask him if he thinks it is a paying proposition to convert wheat at 72s. per 504 lbs. to offal at £8 2s. 6d. a ton. In the past millers produced white flour merely to satisfy an overwhelming demand on the part of the public. As far as I know, they have not boosted white bread in their advertising campaigns. Their slogan was " Bread

for Energy "—not *white* bread for energy. I presume that people who think on the lines that Mr. Bacharach does will throw all the blame on the millers again after the war if the general public demands and insists on getting white bread again. Mr. Bacharach claims an intimate knowledge of trade. If that is true he must have long ago learnt the first axiom of trade, which is to meet a demand. A trader's job is to supply the public with what it wants, and not to educate it as to what it ought to want. That latter job we can leave to Mr. Bacharach and his nutritionist friends.

Mr. Bacharach's plea that he did not say " animals do not consume whole wheat, but that cattle can't be fed on wholemeal flour " is a quibble quite unworthy of him. I presume whole wheat very soon becomes wholemeal flour during its passage through a hen's gizzard, and if it is intended for pigs or cattle it is ground up before mixing it in the swill; in that case the wheat is turned into wholemeal flour before being fed to the cattle.

If after all this Mr. Bacharach is still unconvinced, I am afraid I cannot waste any more of my time and your paper in trying to enlighten him. I have shown him the way to the Pool of Siloam, and if he refuses to wash in it his eyes will remain closed.

Yours faithfully,
T. H. FAIRBROTHER.

17, LISKEARD GARDENS,
BLACKHEATH, S.E. 3.

(*This correspondence is now closed.*—EDITOR.)

Standards of Foods

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—There seems to be no Institution of Authority catering for the standards of foods.

The British Standards Institution covers most things except drugs, which are covered by the British Pharmacopœia, and the Therapeutic Substances Acts by the British Medical Research Council.

Is it not time that we had a British Foods Standards Institution or that the British Standards Institution had a Foods Section?

Yours faithfully,
ARTHUR JONES.

MERTON PARK, S.W. 19.

Fuel Testing

DISCUSSING the matter of the sampling of analysis of both solid and liquid fuels in the second edition of his well-known book,* Dr. Himus mentions the additional work that has been carried out on methods, the results of which have been embodied in revised specifications and publications by the British Standards Institution, the Fuel Research Board and the Institute of Petroleum.

The author stresses the fact that as the whole subject is in a continued state of flux, the fuel technologist must therefore be on the look-out for reports of new and improved methods, some of which by a process of natural selection will survive and find their way into standards specifications.

Where, however, buying and selling of the fuel are in question, and particularly where litigation may arise over questions of non-fulfilment of contracts, the current British Standards Specifications must generally form the last court of appeal where methods are concerned. The methods of sampling given in the book are drawn up so as to be consistent with the latest specifications.

That sampling and examination of fuel is frequently regarded as a luxury rather than as a necessity is considered by the author as a remarkable and somewhat disturbing fact; for some reason, fuel is not regarded as a raw material but employed merely incidentally as the means of producing heat or power.

Just as variations in quality of direct raw material require alteration in the methods of running the plant, so changes in the quality of fuel demand adaptations in methods of using it; and unless the nature of the change in the quality of the fuel or other material is known before the material goes into process, intelligent alteration in the process cannot be made.

Dr. Himus stigmatises our methods of buying and selling coal as antediluvian; coal is bought and sold on the basis of weight and not of heat. The small consumer is at the mercy of the coal merchant, and has no guarantee of the quality of the coal or coke he is purchasing; all he is entitled to is a definite weight of something called " coal " or " coke ", but how much of the material is combustible is quite another matter. Seventeen per cent. of moisture has been found in semi-coke without the buyer being entitled to any legal compensation for what can only be described as gross adulteration.

For this state of affairs there is no justification; solid fuel could and should be sold on a thermal basis, at a " declared " calorific value, in the same way as gas or electricity.

The present edition of the book follows the same general plan as adopted in the original edition. A chapter on combustion calculations has been added; descriptions of analytical methods have been brought up to date and are consistent with those recommended by the British Standards Institution, the Fuel Research Board and the Institute of Petroleum.

As indicated by its title, the book embraces all the different tests employed in the analysis of solid and liquid fuels, and a chapter deals with sampling.

A particularly useful chapter is that on the " Selection of Coal for Industrial Purposes ". Dr. Himus warns the reader that no laboratory test will enable an observer to state with certainty that a particular coal will give the results he is seeking when utilised in a particular plant, nor is it possible to discriminate in the laboratory between the relative variations of two or more coals of very similar characteristics. All that can safely be said as a result of such tests is that particular coals are very likely to prove unsuitable, while others are worth trying in a plant. The final court of appeal must be trial under working conditions in the plant in which it is proposed to use the coal.

The book is well illustrated by plates and diagrams, and the index is good. It is a work that should be found in all fuel-testing laboratories.

* *Fuel Testing.* By Godfrey W. Himus, Ph.D., A.R.C.S., D.I.C., M.I.Chem.E.

Mechanical Refrigeration

IT SPEAKS well for the future of British industry that we are keeping our technical publications up to date, and the fact that our somewhat scanty stock of literature on the science of refrigeration was in need of revision will naturally increase the interest which the fifth edition of *Mechanical Refrigeration** has already aroused.

This contribution of Mr. Hal Williams is doubly noteworthy, as the work of revising the previous edition had to be done at a time when he was suffering from the experience of having been bombed out of home and office, and deeply engaged in the designing of some of our national food stores in his capacity of Cold Store Consultant to the Ministry of Food. A description of one of these national food stores appeared in FOOD MANUFACTURE, May, 1942.

Refrigeration—the Direct Outcome of Research

Offered as " a practical introduction to the study of cold-storage, ice-making and other purposes to which refrigeration is being applied ", stress is laid upon the fact that, unlike steam, which was used for years before the laws governing its action were understood or even guessed at, the science of refrigeration—like that of electricity—is the direct outcome of scientific research. Thanks to this the study of the laws of thermodynamics enabled the forerunners of our present-day refrigeration engineers to discover, invent and work apparatus for the removal of heat or, in other words, the production of cold.

This gives the student of the science of refrigeration a definite advantage, it being possible to base methods upon facts or principles which can be proven by an established formula or a set of tables. It is therefore comparatively easy to follow Mr. Williams in his treatment of the various subjects dealt with in his comprehensive survey of the current methods of refrigeration, a survey which extends to 14 chapters comprising nearly 600 pages and including over 200 illustrations and 10 tables and half a dozen insets.

Dry Ice

Although primarily written more for the guidance of the owner, user and student than for the technician, the latter has been provided with a great deal of information. Examples of this are afforded by the recording of the progress made in the manufacture and use of solid CO_2 (dry ice), in the development of refrigerated trucks and vehicles for the transport of produce requiring a low temperature, and in the methods employed for the quick freezing of fish, meat and other articles, while the final chapter is devoted to the important subject of abattoirs, freezing and meat-packing work. This chapter includes an interesting account of the work of a bacon factory. A descriptive article on this important subject appeared in FOOD MANUFACTURE, April, 1941.

* *Mechanical Refrigeration.* By Hal Williams. Fifth Edition. Pp. 564, illustrations, tables and diagrams. London, 1942. 30s. net.

That the publication of this revised edition was timely and necessary will at once be apparent when one considers that in the application of refrigeration to industry both changes and progress have been continuous. A reference to chapter v will confirm this, as some of the companies whose machines were previously described have now either ceased to exist or have been absorbed by other companies, while earlier models have been replaced by others more in keeping with the progress that has been made during the past few years. New illustrations have been included in chapter v to demonstrate the scientific advance which has been made. Among these are Swiss and American models, the outstanding features of which are specially noted in the accompanying text.

While this chapter will be of particular interest to the engineer who wishes to keep himself thoroughly posted as to new machinery available and the manner in which by the development of high speed the older slow-speed machines are becoming obsolete, those who now approach the matter of refrigeration with the intention of making it a business occupation will find the subject so clearly and fully dealt with as to make the present edition a textbook in which every phase has been presented in a most understandable manner.

Indeed, it may be said that in his introduction Mr. Williams has purposely addressed himself to those with an enquiring mind, and has most lucidly explained just what is refrigeration, thus making it a comparatively easy matter to grasp the technical details of the following chapters. In this introduction the author deals with the basic law of refrigeration, theoretical efficiency, the classification of refrigerating machines, refrigerating agents, the absorption machine and the compression machine.

In language of the simplest kind the reader is told how the production of cold is really the removal of heat, and how this is accomplished by the conversion of work into heat in such a way as to produce cold. Thus one of the most puzzling things to the uninitiated becomes quite understandable. Then by showing the difference between the operation of the steam engine and that of the refrigerating machine, in which use is made of a simple equation, the principle of refrigeration becomes clear, and the reader is able to pass to the manner in which refrigerating machines are divided into two classes, and the necessity of the choice of a refrigerating agent being governed by its boiling point at ordinary pressures, and other technical reasons. This and the details given concerning the absorption and compression machines will be of good service to those for whom chapter vii has been specially written, this chapter, headed " Auxiliary Plant ", commencing with the buying of machinery. Here the author leaves the more technical description for the moment and proceeds to explain to the man about to erect a cold store or an ice factory the purpose of each piece of plant and the practical reason for the several recommendations which are made.

He rightly points out that the main object of the capitalist or business man is to derive a profit from the storage of perishable articles or from the sale of ice, and that, although he will know that for both purposes

refrigerating and other machinery is necessary, he may know little or nothing about the details of the machinery he wishes to buy.

Purchase of Plant

The sound advice which is given in this chapter is most complete, and even includes a very timely reminder that in order to reduce the coal bill (and thus conform to the present urge to save fuel) it is of importance to make use of as much of the heat of combustion as possible. Another reminder is that, as cold stores in the British Isles come under the Factory Act, it is necessary to comply with the electricity regulations drawn up by the Home Office.

So completely has Mr. Williams covered his subject that in chapter xi, devoted to "Cold Storage", one finds that he has dealt with the problems of finding the right site and the manner of building, specifying the types of timber and ferro-concrete constructions as well as that of steel, and giving a number of practical suggestions, some probably based upon his own experience as a consultant on cold storage. The details in this chapter are most valuable to any engineer needing a well-balanced survey of this feature of refrigeration.

Under the heading of "Other Applications" the author has made a most comprehensive survey of the general use of refrigeration, this even extending to air cooling, refrigeration in breweries, rubber and silk factories, at skating rinks and even in mortuaries, so that it may be said that there are hardly any applications which do not find a place in the present volume.

Design of Abattoirs

And finally there is a whole chapter on the design of abattoirs, a subject upon which Mr. Williams is rightfully regarded as an expert. Reference is made to the fact that in the British Isles abattoir practice has been very much behind the times, while in those countries in which animals are killed for the export of their meat the methods have reached a high state of perfection. The insertion of this chapter should do much to improve our methods, which are so unfair to the farmer, who is now doing his best to give us home-grown produce, only to run the risk of having it spoilt by unskilled handling.

With its essential details of the mechanism of refrigeration, this new edition should prove most helpful and should make a wide appeal to those concerned with the development of this section of our industry, which in the matter of preservation of our food in these abnormal times has become of such urgent importance.

We are glad that Mr. Williams has been able to find time to give us the benefit of his wide experience, and that he has again had the help of Mr. A. G. Clausen, as in previous revisions.

E. F. G.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Food Control in Great Britain

The purpose of this monograph,* which has been compiled by Edith T. Denhardt under conditions which one imagines must have involved peculiar difficulties, can best be given in some words from the Preface: "This study is an attempt to analyse the problems of production, distribution and consumption of food in Great Britain during the present war, and the measures which have been adopted to solve those problems. It is concerned with the actual operation of Government planning on a comprehensive scale, which, starting in a very limited way, has been extended until it affects closely almost all processes from the growing of crops . . . to the actual consumption of food. . . . Nutrition is one of the most important elements in any standard of living programme, and a nutrition programme is concerned with the production and distribution of food. The present . . . circumstances are abnormal, to be sure, but the results are not without their lessons for the future. British food control in this war has, to a much greater extent than in the war of 1914-1918, resulted in an accumulation of experiences likely to be of considerable value after the war. Hence the final section deals with the post-war significance of the results of wartime control. . . . It includes a considerable amount of detail that is of interest only to those concerned with the administration of food policy . . . but it is, above all, an analysis of the problems arising in a particular experiment in State control."

The Preface is dated March, 1942, and the book is throughout surprisingly up to date. One of the most valuable features of the book is Appendix III: "Chronology of Food Control", wherein an extensive though admittedly not quite comprehensive list of control orders is given under thirteen headings representing different classes of foodstuffs. This provides a conspectus of regulations down to the early part of 1942. Appendix IV, which sets out under twelve heads the chronological development of rationing, is equally up to date.

The book presents a very complete and well-documented review of its subject, and amply fulfils the promise set out in the Preface. It is very smoothly—it might almost be said, stylishly—written, and gives no evidence to the reader of the numerous headaches that must have resulted from the fusion into an orderly whole of the vast mass of material which awaited digestion. Much material has been taken from the Ministry of Agriculture as well as the Ministry of Food, a substantial chapter being included upon agricultural policy and performance in relation to food supply and control.

Subsequent chapters are devoted to control of supplies and of the channels of distribution, rationing and priority distribution, and food price-control policy. Notable subsections in these are: co-operation with traders (a point strongly stressed), use of normal trade machinery as far as possible, control of imports by the

* *Food Control in Great Britain.* International Labour Office Studies and Reports, Series B (Economic Conditions), No. 35. Pp. vi+272. I.L.O., Montreal, New York and London, 1942. Price, $2 or 7s. 6d.

Government as buyer, milk in schools and other aspects of community feeding, and price margins and the determination of prices. The special difficulties of equal distribution of certain products such as eggs and fish are pointed out, and the authorities are given praise or blame as it seems needed; there is no savour of "officialdom" or of whitewashing.

The study has been so well performed as to be almost beyond criticism, which may be limited to pointing out one minor redundancy and two rather curious omissions. The prices of meat and some other products are given in Appendix V, section 1, in percentages of those of July, 1914; section 2 gives actual present prices per pound of similar foods. Surely it would have been sufficient to give the percentages, or percentage increases, in conjunction with the actual price for each food in 1914? Possibly, however, section 2 is a concession to North American and other readers who cannot be bothered to work out percentage sums in our peculiar currency.

In view of the fact that the compiler is a woman, it is odd that there is hardly more than a mention of the child's ration book, and no definition of a "child". Those who already know can connect up their knowledge with the table on page 126, but there remains a gap in the information offered to readers outside Britain. The other omission refers to the length of the ration period. Except for preserve, where the ration is stated as "per month", and for meals served in catering establishments, where the appropriate qualification is usually given, a ration seems to be held to be synonymous with "ration per week". The points rationing scheme is an ingenious and flexible development, and deserves to receive better than the rather cavalier treatment accorded it by the compiler, who mentions the varying numbers of points in detail, but omits to state for how long a given "ration" (as she calls it) is available. It may be that the points rationing scheme had not been long enough in operation when the book was written for its effects to be properly judged.

Considerable space is given to communal feeding, including the school feeding of necessitous children. These matters are linked up with nutritional policy after the war, and a comparison is made between the food control of the last war, as a "treadmill which ground no corn", and the results expected from a continuation of present food policies. Here, it seems, the author is expecting too much, and also ascribing too much to wartime food control. Although a social food policy is desirable, it will not inevitably result from Government control of food, as the author appears to think it will. The facts about milk in schools and school meals for necessitous children show, indeed, that the schemes regulating the provision of such feeding were independent of wartime orders; the provision of free milk in schools did not assume important proportions until the end of 1941, at which time the scheme for providing free meals in schools had hardly done more than make a start. Neither the inception nor the extension of these schemes was directly due to wartime conditions.

As a factual survey, however, the book should be very useful for reference by all concerned with distribution of food, those concerned by or with communal feeding of any kind, and those interested in the economic and social aspects of governmental regulation of any trade.

H. N.

Joint Council of Professional Scientists

A JOINT Council of Professional Scientists, representing over 10,000 qualified scientists, has been set up under the chairmanship of Sir Robert Pickard, F.R.S., by the Institutes of Chemistry and Physics in association with representatives of professional botanists, geologists, mathematicians and zoologists. The Council has been established to voice the collective opinion of qualified scientists on matters of public interest, to provide a liaison between professional organisations of scientists for co-ordinated action in matters of common interest, and in particular to concern itself with the following objects:

(i) The utilisation of scientists to the best advantage in the service of the community.

(ii) The education, training, supply and employment of scientists.

(iii) The better understanding of the place of scientists in the community.

(iv) The maintenance of adequate qualifications and ethical standards among professional scientists.

(v) The supply of information and advice to public and other bodies on matters affecting scientists.

The members of the Council are as follows:

Representing the Institute of Chemistry:

Dr. J. J. Fox, C.B., O.B.E., F.I.C. (President, Institute of Chemistry).
Prof. Alexander Findlay, F.I.C.
Dr. G. Roche Lynch, O.B.E., F.I.C.
Sir Robert Pickard, Kt., F.I.C., F.R.S.
Dr. H. A. Tempany, C.M.G., C.B.E., F.I.C.
Mr. R. B. Pilcher, O.B.E. (Registrar and Secretary, Institute of Chemistry).

Representing the Institute of Physics:

Prof. Sir Lawrence Bragg, Kt., O.B.E., F.Inst.P., F.R.S. (President, Institute of Physics).
Prof. J. A. Crowther, F.Inst.P.
Mr. E. R. Davies, F.Inst.P.
Dr. B. A. Keen, F.Inst.P., F.R.S.
Dr. H. Lowery, F.Inst.P.
Dr. H. R. Lang, F.Inst.P. (Secretary, Institute of Physics).

Representing Botanists:

Prof. W. Brown, F.R.S.

Representing Zoologists:

Prof. D. Keilin, F.R.S.

Representing Mathematicians:

Prof. S. Chapman, F.R.S.

Representing Geologists:

Prof. H. H. Read, F.R.S.

The Joint Council has been established for the period of the national emergency, but it may form the nucleus of some more permanent organisation to facilitate the close collaboration between professional men and women practising in all branches of science.

Dr. H. R. Lang, Joint Council of Professional Scientists, c/o the Institute of Physics, at its temporary address, The University, Reading, Berks, is Honorary Secretary.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, December 1, page 352.

No.	*Date.* 1942.	PRICE FIXATION ORDERS
1490	July 29.	Threshold Home-Grown Peas (Control and Prices) Order. Revokes S.R. & O. 1941 Nos. 1081 and 1663, and 1942 Nos. 276 and 830.
1491	,, 29.	Threshed Feeding Peas (Control and Maximum Prices) (Great Britain) Order. Revokes S.R. & O. 1942 No. 366.
1492	,, 29.	Oats (Control and Prices) (Great Britain) Order. Revokes S.R. & O. 1941 Nos. 1130 and 1794, and 1942 Nos. 472, 474 (oats only) and 1087.
1493	,, 29.	Amending the Flour (Control and Prices) Order, 1941.
1495	,, 29.	Amending the Dried Peas, Beans and Lentils (Control and Maximum Prices) Order, 1941, and giving directions thereunder.
1496	,, 29.	Home-Grown Apples (Maximum Prices) Order. Revokes S.R. & O. 1941 Nos. 1339 and 1637.
1497	,, 29.	Game Birds (Maximum Prices) Order.
1498	,, 29.	Potatoes (1942 Crop) (Control and Prices) Order. Revokes S.R. and O. 1942 Nos. 861 and 1394.
1499	,, 29.	Carrots (1942 Crop) (Control and Prices) Order. Revokes S.R. & O. 1942 No. 1298.
1551	,, 31.	Barley (Control and Maximum Prices) (Northern Ireland) Order. Revokes S.R. & O. 1941 No. 1619 and 1942 Nos. 474 (barley only) and 1355.
1552	,, 31.	Home - Grown Beans (Maximum Prices) (Northern Ireland) Order. Revokes S.R. & O. 1941 No. 1544.
1553	,, 31.	Threshed Feeding Peas (Maximum Prices) (Northern Ireland) Order.
1554	,, 31.	Oats (Control and Prices) (Northern Ireland) Order. Revokes S.R. & O. 1941 Nos. 1146, 1793* and 1972, and 1942 Nos. 298, 472*, 474*, 814 and 1087*.
1555	,, 31.	Home-Grown Wheat (Control and Prices) (Northern Ireland) Order.
1561	Aug. 1.	Amending the Salmon (Maximum Prices) Order, 1942.

		CONFECTIONERY
1754	Aug. 29.	Amending the Sugar Confectionery and Chocolate and Chocolate Confectionery (Distribution) Order, 1942.

* Part only revoked.

No.	*Date.* 1942.	FEEDING STUFFS
1649	Aug. 15.	Amending the Compound and Mixed Feeding Stuffs (Control) (No. 2) Order, 1940.
1668	,, 25.	Feeding Stuffs Distribution (Licensing and Control) Order, August 25, 1942.
1694	,, 25.	General Licence.
1695	,, 25.	General Licence (Retailers).
1697	,, 25.	General Licence, August 25, 1942, under the Feeding Stuffs Distribution (Licensing and Control) Order, 1942, the Feeding Stuffs (Control) (Northern Ireland) Order, 1941, and the Milled Wheaten Substances (Restriction) Order, 1940; and Directions under Regulation 55 of the Defence (General) Regulations, 1939. Revokes S.R. & O. 1941 No. 2063.
1753	,, 29.	Amending the Compound and Mixed Feeding Stuffs (Control) (No. 2) Order, 1940.
1899	Sept. 17.	Amending the General Licence, August 25, 1942, under the Feeding Stuffs Distribution (Licensing and Control) Order, 1942, the Feeding Stuffs (Control) (Northern Ireland) Order, 1941, and the Milled Wheaten Substances (Restriction) Order, 1940, and the Directions under Regulation 55 of the Defence (General) Regulations, 1939.
1992	,, 28.	Amending the Feeding Stuffs (National Priority Pigeon Mixture) Order, 1941.

		GENERAL
1432	July 22.	Prescribing an Appointed Day for the purposes of the Food (Restriction on Dealings) Order, 1941 (1941 No. 1234) (Chocolate Couverture).
1471	,, 25.	Amending the Food Control Committees (Licensing of Establishments) Order, 1941.
1472	,, 25.	General Provisions. Rationing. Revokes S.R. & O. 1939 Nos. 1856 and 1891; 1940 Nos. 13, 14, 27, 69, 110, 324, 325, 415, 757, 806, 897, 903, 1182, 1272, 1416, 1591, 1735, 1848, 2123 and 2146; 1941 Nos. 15, 36, 299, 442, 626, 696, 786, 815, 928, 964, 982, 1107, 1261, 1348, 1635, 1638, 1825 and 1992; and 1942 Nos. 24, 41, 175, 328, 646, 647, 648, 650, 829, 841, 862, 884, 1022, 1055, 1220 and 1265.

News from the Industry

Tinned Fruit and Vegetables

The Ministry of Food states that tinned fruit and vegetables will not be released for sale until some time in the New Year. When released they will probably be put on points.

* * *

Food Samples

The Minister of Food has made an Order conferring on inspectors of weights and measures powers already exercisable by sampling officers under the Food and Drugs Act to take samples of food free from the restrictions of any other Orders.

* * *

Imports of Dried Meat

It will be some time before dried meat, which effects great saving in shipping space, can be used on a commercial scale in Britain, was stated by an official of the Ministry of Food recently.

Small quantities are being imported, but hopes of considerable shipments before the end of the year have had to be modified.

* * *

Cleaner Milk

As a first step towards a cleaner milk supply laboratory equipment for testing has been installed at more than 1,000 large depôts where milk is received. Arrangements for training testers (probably mainly young women) as the scheme develops are being made. The provisions already made will, it is hoped, greatly reduce waste through souring next summer.

Other openings for women in the milk industry are forecast in the decision to set up a national milk-recording scheme, to operate from January 1. This will provide for monthly weighings of each cow's milk. Production will then influence rationing allowances. The scheme is also intended to help in the breeding of high milk-production stock and in the eradication of disease in dairy herds.

Ban on Table Jellies

From now on no more table jellies and similar products will be made, except under licence, but existing wholesale and retail stocks may be sold up to March 31 next.

Prepacking of gelatine is also banned, except under licence, by a Food Ministry Order giving effect to the restrictions announced in June.

* * *

Meat Prices

A simplification in meat prices and specifications was introduced on December 14 under a Food Ministry Order aimed at bringing about a more uniform standard of butchery practice throughout Britain to meet wartime needs.

There is now one set of price schedules throughout England and Wales, and only ten cuts for beef. Wholesale and retail prices are adjusted to bring about greater equality in the gross profit margin in various categories of meat. The amount charged, however, by the Ministry to the trade or by the trade to the consumer is little altered.

* * *

Home Trade Register

The revised Home Trade Register of manufacturers, wholesalers and mercantile agents, registered under the Limitation of Supplies (Miscellaneous) (No. 16) Order, 1942, has now been published, and can be purchased from H.M. Stationery Office at the following addresses:

York House, Kingsway, W.C. 2.
120, George Street, Edinburgh, 2.
39-41, King Street, Manchester, 2.
1, St. Andrew's Crescent, Cardiff.
80, Chichester Street, Belfast.

* * *

World's Wheat Production

The Department of Agriculture estimates the world's wheat production, exclusive of Russia and China, at 3,980,000,000 bushels, which is approximately 230,000,000 bushels more than last year.

Australia as Vast Food Pool

Plans to make Australia into a great food centre, as part of Allied war strategy, in the Pacific zone are expected to emerge from conversations between Mr. Jack Beasley, Commonwealth Minister of Supply and Development, and United States officials.

American authorities have told the Commonwealth Government that because of the shipping position all outward traffic from America must concentrate upon the delivery of munitions and war supplies.

The solution is likely to be the building up of a gigantic Australian food industry. It is understood that assurances have already been exchanged between the two countries.—*Reuter.*

* * *

Orange Juice and Cod Liver Oil

Concentrated orange juice from the United States is now available for all children up to the age of five years, instead of three as hitherto. Cod liver oil compound was already available for children up to five, and both products, rich in essential vitamins, can now be obtained under the Government scheme by expectant mothers during the last six months of pregnancy.

A bottle of cod liver oil compound which will last about six weeks costs 10d., and a bottle of orange juice, equal to a dozen oranges and sufficient to last a fortnight, costs 5d. Those who cannot afford these charges can obtain both free.

* * *

Mr. Lyttelton Lunches on Dehydrated Food

Mr. Oliver Lyttelton, British Minister of Production, with several other United States and British food officials recently attended a luncheon in Washington where the menu consisted entirely of dehydrated foods.

The purpose of the luncheon was to show guests the progress made in the United States in the field of dehydrated foods.

British Export Trade

An address on "The Co-operative Export Plan", given by Mr. L. G. Adams, M.I.Ex., at the Regent Advertising Club at the end of November, contained suggestions whereby manufacturers who are producing non-competitive products but who sell to the same trades or users, can combine in the series of groups to sell co-operatively overseas with greater efficiency and at a fraction of the cost of maintaining individual export sales organisations. In practice, Mr. Adams' plan is the antithesis of the Board of Trade's Industrial and Export Group scheme; whereas the latter is based on co-operation among firms who are completely competitive and who therefore have not as a rule the slightest desire to work together, the "Co-operative Export Plan" keeps competitors apart and brings together firms whose common ground is not the product but the point of sale; additionally, in contrast with the Export Groups the "Co-operative Selling Plan" comprises actual sales organisations wherever there is a market for British goods.

* * *

Argentina Takes Over Port Works

The Argentine Government has formally taken over the port works of the big meat and grain port of Rosario, on the expiration of the forty-year concession granted to the French contractors, Hersent Schneider. The concessionaires only delivered up the port works under protest, and have started legal proceedings against the National Government, claiming damages and compensation.

A public ceremony, attended by President Castillo, several Cabinet Ministers and a huge crowd, marked the taking over of the port works.

* * *

Millet and Maize in Bread

Millet seed, used extensively for fowl and sheep food, has been given an added importance in the Gold Coast as a substitute for wheat and flour. Bread containing 15 per cent. millet and 10 per cent. of maize is now regularly eaten in Accra.

Metal Foils for Milk Bottle Caps

A paper by R. Kerr, M.Sc., Ph.D., in the *Journal of the Society of Chemical Industry*, August, 1942, is reprinted in the Tin Research Institute's publication No. 113. It describes investigations of the effects of certain alloys in contact with milk undertaken when the war situation made it necessary to find a substitute for aluminium caps.

The substitutes proposed were a tin-zinc alloy (92 per cent. tin), tinned lead foil and tinned copper foil. In some tests specimens of foil were immersed in milk, and in other cases bottles of milk were capped with the foils. The effect on the milk and the quantities of metals absorbed were determined.

It was found that undesirable contamination arises when milk bottles are capped with tinned lead foil, as the foil interacts into the cream layer. Satisfactory results were, however, obtained from the trials with tinned copper and the tin-zinc alloy foils.

The production of a satisfactory thin copper foil coated with tin was found uneconomic in wartime, and as the physical properties of the tin-zinc alloy were satisfactory, and it could be readily made with the standard equipment, a 100 per cent. substitution was effected. It was used until the need for tin economy arose as a result of the war in the Far East.

* * *

Albion Food Mills

We are informed that the Albion Food Mills has been requisitioned for urgent Government purposes, and arrangements are in hand to continue part production from the Royal Food Mills at Stoke Newington. George King and Co., Ltd., advise that during the transitional period there may be some delay in dealing with orders for infant foods, infant food bases in bulk, invalid foods and health foods, and they crave the kind indulgence of their customers.

The registered office of the company will remain at Kingsbury and there will be no alterations in telephone numbers or telegraphic address.

Pictures for Canteens

The National Gallery has initiated an excellent series of lithograph reproductions of pictures in the War Artists' Exhibition for the special purpose of hanging in canteens.

One of them is a very striking representation of the "Battle of Britain" by Paul Nash, who describes his picture as "an attempt to give the sense of an aerial battle in operation over a wide area, and thus summarise England's great aerial victory over Germany".

Another interesting example is Barnett Freedman's "15-inch Gun Turret, H.M.S. *Repulse*". This is an original lithograph done by Captain Freedman from drawings he made on the *Repulse*.

The size of these reproductions is 30 ins. by 40 ins., and the price to factory and service canteens is 4s. each, and to the public 6s.

The National Gallery, of course, also supplies colour reproductions of some of the "Old Masters", or photographic enlargements of classical paintings from its peacetime collection.

* * *

Preparing for Post-War Service

In pre-war days James H. Randall and Son, Ltd., served the food industry with trucks, trolleys and storage equipment, specialising in the manufacture of copper, brass, aluminium, zinc, tin and stainless steel articles for ice cream, food, dairy, chemical and other trades.

Looking ahead to the era of peace, Randalls announce that their plans are already made for the change-over from national to normal production. Then they hope to renew pre-war contacts; for the time being work of national importance must come first.

* * *

Canadian Sugar Production

Combining 1,010,875,797 lbs. of cane sugar and 201,677,886 lbs. of beet sugar, the sugar production in Canada in 1941 (1,212,553,683 lbs.) showed an increase of 55,744,195 lbs. on that of 1940. In 1941, cane sugar increased by more than 67½ million lbs., while beet sugar production decreased by nearly 12 million lbs.

Citrus Fruit Juices Control

The Advisory Committee desire to remind allottees that the period of operation of the scheme was originally for twelve months to December 31, 1942, "and for such further period as may be ultimately agreed by the Advisory Committee in consultation with the Ministry of Food".

Under present conditions the Ministry and the Committee are in agreement that the scheme should continue for at least a further year, and a letter received from the Ministry runs as follows:

"I am directed to refer to a recent recommendation of the Advisory Committee that the scheme for regulating the importation and distribution of citrus fruit juices should continue to operate for at least a further year, and to inform you that the Ministry fully concurs.

It must be borne in mind, of course, that it will probably be necessary for certain amendments to be made from time to time, as such factors as concentration of industry are bound to have some effect on the operation of the scheme. For instance, the scheme provides for all manufacturers to participate in supplies of juice proportionately to their purchases in the year ended August 31, 1939. Obviously concentration, zoning, etc., will mean that in a number of instances considerable modification will undoubtedly have to be made in the method of allocation.

I am asked to convey the Ministry's very sincere appreciation of all the work that has been, and is still being, devoted to the interests of the trade by the Advisory Committee. It cannot now be too premature to say, after many months of working, that the scheme is undoubtedly achieving the objectives for which it was inaugurated, and the entire industry owes a real debt of gratitude to the unselfish and untiring efforts devoted to its interests by the Advisory Committee."

The Advisory Committee have pleasure in informing the Industry that the import programme for the fourth year of the war, commencing January 1, 1943, is now being arranged by the Ministry with the Governments of the respective countries of origin.

With the object of saving shipping space the amount of concentrated juice to be imported will be increased, and unconcentrated juice will be reduced to a minimum, and unless this policy is subsequently revised it is unlikely that any supplies of lime juice (which is imported in an unconcentrated form) will become available for general use during the year 1943.

* * *

Essence Firm Names Tank

In the "Tanks for Attack" campaign which has just terminated, Messrs. Lautier Fils, Ltd., have topped the list for their area, and are accordingly entitled to name a tank. The campaign as organised was to take the period of ten weeks from the week ending July 24 to September 26 inclusive, based upon last year's purchases of War Savings Certificates, and the right to name a tank was to be allotted to any three industrial firms in the area who could show the greatest increase on and above 20 per cent. of last year's subscriptions during the same period this year.

Messrs. Lautier Fils, Ltd., have by a prodigious effort succeeded as one of the three winners in this patriotic competition, and have decided to name their tank "Fighting Frenchman".

* * *

Non-Corrosive Fluxes

The only disadvantage of all true safety fluxes is that they are relatively slow in action and cannot compare in speed of production with active or chloride fluxes. The advantage is that complete freedom from acid or corrosive action is assured—their use eliminates the failures due to corrosion.

The safety flux, "Alchor-re", is an excellent example of a true safety flux, and to improve this the makers, Fry's Metal Foundries, Ltd., have introduced into it an organic compound which, while substantially increasing the wetting and spreading power, does not in any way affect the safety properties; these remain unimpaired.

The improvement is available in both the paste and the liquid flux, under the name of Activated Paste Flux and Activated Soldering Fluid. The new type was approved by A.I.D.—October 22, 1942, under Ref. Res. Mat. 677/R.D. Mat. 1(a)/E. for M.A.P. work, and can be released on A.M. Form 705.

Plastic Tokens Replace Paper Tickets

A letter from a restaurant supervisor states: "During my recent tour of the British Isles I could not help but notice the increase in the use of Plastic Tokens by British Restaurants, works canteens and various town restaurants.

"We all know that the Paper Control are doing everything they can to restrict the use of paper in this direction, and it seems to me that these plastic tokens are the answer.

"From discussions I have had with various British Restaurant managers, I find that the tokens are simpler to use than tickets, and save a considerable amount of time when taking payment from a large number of customers. This is particularly so during rush hours.

"There are various types of tokens in use; most of them are either 1 in. or 1¼ in. (about the size of a penny). They are in different colours, each one for a particular whole or portion of a meal. Some state this on the token and others state the value paid for it, *i.e.*, 8d., 6d., 9d. or 1s.

"I feel I must congratulate the Paper Control on this move, as I feel sure that the saving in paper, from the country's point of view, will be tremendous.

"The restaurants also must considerably reduce expenditure spread over a period of twelve months."

* * *

Tin Cans into Bottle Crowns

In an attempt to increase its supply of bottle crowns, the Pepsi-Cola Company recently began collecting old tin cans, and acquired nearly 15,000 to use for experimental purposes. The only soft drink company in America that manufactures its own crowns, Pepsi-Cola is building special machinery to cut at the seams, wash, then stamp the crowns out of the cans. If the plan is a success, the company expects to punch 40 crowns out of each No. 10 can, adding 10 per cent. to the total output, which, under the present conservation order, is now 60 per cent. of that used in 1941.

OBITUARY

Mr. H. J. Pooley

It is with very great regret that we record the death on December 2 of Mr. H. J. Pooley, M.I.Chem.E., who for thirteen years has been general secretary of the Society of Chemical Industry. Mr. Pooley, who was 65, had been compelled by ill-health to resign this office last August, on which occasion the Council of the Society made him a presentation, which was accompanied by an illuminated address recording the society's "deep appreciation of his untiring efforts on the society's behalf", describing him as the society's "splendid ambassador". At the last annual general meeting, also, the president paid a special tribute to Mr. Pooley, recalling his work in organising the jubilee celebrations of the society and in particular his achievements in fostering the society's sections and ancillary organisations. The tribute went on to refer to H. J. Pooley's "catalytic personality", and attributed largely to him the friendly feeling that exists throughout the society.

In his professional career Mr. Pooley was a chemical engineer of distinction. He was the first student to go through a course of chemical engineering at a British university (Liverpool) in 1894-98. He joined the staff of George Scott and Son, makers of chemical plant, in 1898. He was appointed director and secretary of that firm, and director of Ernest Scott and Co., in 1906, and eventually became one of the principal shareholders of George Scott and Son and joint managing director of the company.

He retired from Scotts in 1923 and occupied himself with consultancy work until his appointment with the Society of Chemical Industry.

He held many patents for process and plants, concerned principally with evaporation, distillation, drying and oil extraction.

His professional interests gave him a special concern for the work of the Chemical Engineering Group, of which he was at first hon. treasurer and eventually hon. secretary.

Mr. Pooley was interested in gardening and took prizes at local flower shows. Among other sports activities, he was one of the official referees for rugby.

The publishers of FOOD MANUFACTURE wish to add their own personal tribute to one whose help and encouragement in the early days of its foundation, and thereafter, contributed so much to its success.

* * *

F. W. Clifford

The death is announced of Mr. F. W. Clifford, Librarian to the Chemical Society. Mr. Clifford had held that office since 1903. Those who have had the privilege of using the Library of the Chemical Society will remember him well as an enthusiastic and kindly helper to those studying special literature. In his time the library's collection of books had increased threefold—from 15,000 to 45,000 volumes. Mr. Clifford was well known in his profession and had provided evidence for the report on the Public Libraries in England and Wales presented to the Board of Education in 1927; was a member of the Library Association; and served on the Council of the Association of Special Libraries and Information Bureaux from 1925 to 1930.

* * *

Mr. F. A. Carr

The death has occurred at Rosebery House, Gorebridge, at the age of 69, of Mr. Frank Arnold Carr, Chairman of Carr's Flour Mills, Ltd., of Carlisle. Mr. Carr acquired Rosebery House from the Earl of Rosebery at the Whit-Sunday term. He was last year High Sheriff of Cumberland and took a keen interest in the affairs of Carlisle, of which he was a native.

Uses for Cocoa Butter

Use of cocoa butter as cooking fat and cocoa for making cocoa soap is being popularised in the Gold Coast as part of the Government's scheme to solve import and export problems, and to use up surplus cocoa crops in the colony. These are two of the many new household uses for cocoa which are being encouraged. Sales of pamphlets containing different recipes for household uses of cocoa totalled 7,500 during the past year, and more than 6,000 people attended courses of instruction on new uses of cocoa arranged at the main centres of the colony.

More than 25,000 loads of ready roasted and broken cocoa beans have been distributed.

* * *

Bones for Salvage

Writing to *The Times*, Mr. R. C. Morrison, Chairman, Waste Food Board, said: "Bones are urgently needed for our war effort. They yield nitro-glycerine for shells, lubricating oils for guns and tanks, glue used in the manufacture of aircraft and ships, foodstuffs for pigs and poultry, and fertiliser for enriching crops. At present, seamen must bring cargoes of bones through waters infested with deadly perils from mines and torpedoes. If all the bones which could be salved in this country were made available these imported cargoes would not be necessary.

"Thousands of tons of bones are being lost annually through being buried by dogs. It is perhaps not so widely known as it should be that bones are not essential to the health of a dog. Indeed, some types of bone which tend to splinter may occasionally cause internal damage. Although the association of a dog and a bone is for some reason or another a close one, there is a large body of expert opinion definitely against giving bones to dogs. It seems at present, when bones are so desperately needed for the war effort, that it would not only save shipping but also the lives of our merchant seamen—and, incidentally, be to the benefit of the dogs themselves—if bones, instead of being given to dogs, were made available for salvage. Every bone, even the smallest one, is urgently needed."

Mr. R. L. Brown

Mr. R. L. Brown, Managing Director, has been appointed Chairman of Directors of Hopkinsons, Ltd., Huddersfield, in succession to Mr. Robert A. Hopkinson, who has resigned from the Board of Directors.

* * *

W. P. Butterfield, Ltd.

W. P. Butterfield, Ltd., announce that they have opened a London office at Africa House, Kingsway, London, W.C. 2, Tel. Holborn 1449. This office will be in charge of Mr. J. C. Dudgeon, a director of the firm.

* * *

Canada—U.S.—Britain Dried Fruits Agreement

An agreement has been reached between Canada, the U.S. and the United Kingdom concerning the movement of dried fruits during the 1942-43 marketing season.

This announcement was made jointly by the Canadian Department of External Affairs and the Combined Food Board in Washington.

The object of the agreement is to meet the full requirements of the armed forces and give equitable treatment to the civilian populations, it was stated.

* * *

Maize Starch Trade

Maize Starch Distributors Association has been registered to carry on an organisation for the distribution of maize starch, feeding stuffs and farinaceous products. The directors are: Messrs. A. Coronel (director of Corn Products Company), V. C. Haines (chartered accountant), L. C. Ambrose (director of A. E. Staley Manufacturing, London), G. H. Duncan (director of Barter Trading Corporation). There is no share capital.

* * *

Change of Address

Mr. R. Julliard, who handles yeast in powder and tablets as agent for English Grains, Ltd., Burton-on-Trent, has removed to 28, Peterborough Road, Hurlingham, S.W. 6. Telephone: Renown 2429.

OBITER DICTA

● To-day a husband and father might be defined as a man whose coupons clothed his family.—*Claude Mullins, the London magistrate.*

● I just don't know how to share the six tins of turkey I have received among my thousands of customers.—*Manager of one of Birmingham's leading grocery firms.*

● Is it still true that you can sell infected milk without punishment, but not infected water? — *Commander Locker-Lampson in the House of Commons.*

● We have recently asked the Agricultural Research Council to consider the possibility of carrying out investigations in the use of temporary narcotics for dealing with house sparrows. —*Mr. R. S. Hudson in the House of Commons.*

● I defy any man to say he is managing his cows if he doesn't record them. If you aren't recording them, you shouldn't be allowed to keep them, because you shouldn't keep anything you can't manage—unless it is your missus. And if you can't manage her, don't go one worse by keeping cows you can't manage either! — *Professor Boutflour, addressing a meeting of Leamington farmers.*

● According to Mr. Hudson, Britain is at present growing 63 per cent. of her total food. Until the figure is 100 per cent. can we really afford to harbour "uneconomic converters" like bullocks? Much of the land that is producing fodder for fat cattle could be raising food for direct human consumption—cereals or potatoes or milk, the priority animal product.—*From "The Food Front", "The Financial News".*

● It is regrettable to have to state that the figure of 11·5 per cent. of adulterated or non-standard articles creates an all-time high record for our county, the figures for the last three years being: 1938, 5·4 per cent.; 1939, 6·5 per cent.; 1940, 9·0 per cent.—*Mr. Stacey Hallard, Chief Inspector of Weights and Measures, in the Annual Report of the Medical Officer of Health for Cheshire.*

"Save Water" Campaign

The Metropolitan Water Board's "Save Water" Campaign has been running since the April 11, and has been a marked success.

Since the early days of the campaign there has been a downward trend in water consumption. For purposes of comparison, in the month of October for the years 1938, 1941 and 1942 the figures for this year are 38 millions per day lower than in 1938, and 15 millions per day lower than in 1941. If the downward trend shown in the last few months is maintained there are strong hopes of getting much nearer to the target than promised at one time. The October figures translated into tons of coal are 57 tons per day less than 1938, and 22½ tons per day less than 1941. For the month the figures would be 1,767 and 693 tons respectively.

* * *

Raw Materials in War

Statistics given by Colonel C. G. Vickers, V.C., Deputy Director of the Ministry of Economic Warfare, in a lecture at the Royal United Service Institution, re-revealed that: 75 per cent. of the raw materials in this war are for food; 10 per cent. are for fuel; 15 per cent. covers all other activities.

Colonel Vickers said these figures showed that war was not the first charge on our activities.

The Earl of Selborne, Minister of Economic Warfare, who presided, said he would have preferred that the Ministry should have its old name of Ministry of Blockade. But now blockade was only part of the problems with which it was concerned.

* * *

New Butter Substitute

A new substitute for butter which is "highly nourishing and with an extremely pleasant flavour" has been produced by the New Zealand Research Institute.

The product consists of 60 per cent. pure butterfat, 20 per cent. stearine or pure beef fat and 20 per cent. dried milk.

"It is easy to spread and can be used in the same way as real butter", Mr. J. G. Barclay, N.Z. Minister of Agriculture, stated recently.

Companies

Foster Clark, Ltd.

The annual general meeting of Foster Clark, Ltd., was held on December 1 at the registered office, Hart Street, Maidstone.

Mr. Henry C. Clark, J.P., the chairman, presided.

The following is an abstract of the statement by the Chairman circulated with the report and accounts for the year ended September, 1942:

The accounts for the year ended September, 1942, show a trading profit, after provision for excess profits tax, of £79,493. This is apparently a decrease of £18,915 compared with the previous period, but, as mentioned in my speech at the time, the profits of that year (ended September, 1941) were swollen by a special non-recurring credit which more than accounts for the difference between the two years. Income from investments at £28,765, although less by £2,440, in all the circumstances is considered to be satisfactory. The decrease is explained by the smaller total of investments and by the increase in British Government stocks carrying a lower rate of interest.

The combined trading profit and investment income amounts to £108,258. After deducting war risks insurance £10,054, A.R.P. expenditure £4,427, and directors' fees £2,500, there remains a balance of £91,277. Your directors recommend a final dividend on the Ordinary stock of 12½ per cent. (making a total for the tenth successive year of 20 per cent), and, including dividends already paid, this will absorb £77,500. It is proposed that of the balance there shall be added to advertising reserve £6,000, contingency reserve £2,000, and £5,777 to increase the carry-forward to £66,593. Bearing in mind that the larger part of the company's production is still being sold at pre-war prices, and that the cost of materials and wages have much increased, your directors think the result of the year very good. The importance of the company's products is recognised by the authorities, and close co-operation has been maintained with the Ministry of Food in its difficult task. The exceptionally strong financial position and the large liquid reserves are a source of great strength to the company. Taking all circumstances into consideration, your directors are hopeful regarding the future.

* * *

Leach's Argentine Estates

At the thirtieth ordinary general meeting of Leach's Argentine Estates, Ltd., the statement of the vice-chairman, Baron F. A. d'Erlanger, was circulated with the report. The following are some abstracts of the report:

The profit on trading at £189,356 is an improvement of £12,063 compared with the previous period. The directors recommend the payment of the 6 per cent. non-cumulative dividend on the Ordinary stock. With regard to the 1941 sugar crop, the total amount sold was a little less than the previous year, but the average price obtained showed a marked improvement. From June, 1941, when the new convention entered into by members of the sugar industry came into force, prices gradually recovered to their present level.

With regard to the 1942 sugar crop, all the sugar-producing regions in Argentina have been severely hit by the earliest and most intense frosts experienced since 1918. The company's production has fallen to about 16,000 tons, but fortunately we had in hand at April 1, 1942, a fairly heavy carry-over stock, which, together with this year's production, should be sufficient to carry us through until the start of the 1943 crop.

Costs of bags and materials have advanced considerably, and an increase of 10 per cent. on railway freights has now come into force. In addition, all salaries and wages were revised as from May last. Assuming, however, that the present selling prices are maintained, there would not appear to be any grounds for undue concern, though we must anticipate some reduction in our net profit for the year.

The report was unanimously adopted.

Oil Salvage

The salvaging and re-refining of used lubricating oil has been given a prominent place in the conservation propaganda of the Ministry of Fuel and Power. A circular, signed by Sir William B. Brown, has been issued by the Petroleum Division of the Ministry of Fuel and Power to all engineering and shipbuilding firms, insisting that "the shipping position makes it imperative to avoid any waste of lubricating oil, and to turn all used oil to the best possible advantage". After a reference to the circular of the Lubricating Oil Pool, issued through trade associations on March 27, on the subject of economy in the use of oil, the circular concentrates on the question of salvage and re-use of waste oil. It contains suggestions of how waste oil can be treated by (*a*) filtration and centrifuging, (*b*) re-use unfiltered, (*c*) re-refining, (*d*) disposal for other purposes, *e.g.*, grease-making, or as a fuel.

The method of re-use or disposal should be determined with regard primarily to securing the fullest use of waste oil compatible with economy in transport. Arrangements have been made under which expert advice on the above matters will be given by the Lubricating Oil Pool, Brettenham House, Lancaster Place, London, W.C.2, to whom any enquiries should be directed.

BRITAIN'S OIL HAS TO BE IMPORTED
USE
LESS OIL
AND HELP THE
MERCHANT SEAMEN
OIL IS WASTED BY DROPS
• DON'T LEAVE TAPS DRIPPING
• DON'T USE LEAKY OIL CANS
• DON'T SPILL WHEN YOU FILL
• DON'T OVER-LUBRICATE
• WASTE OIL MUST BE RECLAIMED

Information and Advice

Glazing for Buns

8,402. *Required, information relating to the use of suitable materials for the manufacture of a liquid for use in brushing confectionery for the purpose of imparting a non-sticky gloss to the finished buns or pastry.* (London.)

Bennion and Stewart, in their book *Cake-Making*, give the following instructions :

There are many mixtures used for this purpose, and preparations are now sold which require only the addition of warm water to produce liquid which can be used as a glaze. One of these, which has been examined, is nothing more than ordinary powdered glue, and, whilst producing a glaze, confers an unpleasant hard surface and bitter flavour on the bun.

The following glazes will give satisfactory results :

1. An egg and water glaze, consisting of two parts egg and one of water, thoroughly whisked. Fresh eggs will give a better glaze than frozen eggs.
2. One egg, a gill of water, and 1 oz. of sugar, all thoroughly mixed. This will produce a good gloss, but will be slightly sticky.
3. Stock syrup in which 1 oz. of gelatine has been dissolved will produce a good glaze. Stock syrup alone produces an extremely sticky glaze—unless the buns are placed back in the oven to enable the syrup to set after it has been applied—and should only be used in those districts in which such a glaze is desired.

Phosphoric Acid, etc.

8,202. *Required, information regarding the use of phosphoric acid and phospho-citric acid in the manufacture of mineral waters, syrups and cordials, fruit squashes and crushes. Also the most convenient strength to use and quantities per gallon of syrup.* (London.)

" Phospho-citric acid " is the name of a particularly pure brand of *ortho*-phosphoric acid marketed in 55 per cent. aqueous solution.

Many people prefer the taste of phosphoric acid to that of citric acid as being less harsh, and its use is well established in the mineral water trade. The taste of the acid blends well with the flavours of *citrus* fruits, and its use is generally considered especially desirable in lime-flavoured drinks.

The proportion of acid to syrup will, of course, depend on whether a very tart-tasting beverage is required, or one which is only slightly tart, and the question, therefore, is a matter of taste. In actual practice, *ortho*-phosphoric acid is roughly twice as strong as citric acid; and the manufacturers of phospho-citric acid recommend that, in using it to replace citric acid, 1 fl. oz. can be taken as equivalent to 1 oz. of crystalline citric acid.

A big advantage attaching to the use of phosphoric acid is that its aqueous solutions, unlike those of citric acid, are not liable to fermentation.

Unlike citric acid, phosphoric acid is not oxidised in the body to carbon dioxide and water; and the acid tends to render the urine acid, though the effect is not very marked.

The acid is non-toxic, its dilute solutions are excellent thirst quenchers, and they serve to stimulate the gastric functions. It might, however, be unwise to use the acid in place of citric acid in any products marketed as lemon juice or orange juice substitutes.

Cake Flour

8,459. *Required by manufacturers of self-raising flour, a recipe for a cake flour to be used without addition of egg.* (Devonshire.)

Each manufacturer of cake flour usually evolves a suitable recipe for this product after experimental work on the subject.

Cake flours as sold to the public to-day consist of self-raising flour with an addition of extra baking powder, soya flour, dried egg, salt, egg colour and sweetening powder when required. The proportions used depend on the quality of the product required. The better the quality wanted, the more egg is used.

The strength of the colour used determines the percentage that is necessary to use, but when the best quality of colour is obtainable, 0·5 per cent. is generally sufficient.

The quantity of saccharin to be used depends on the strength of the product and amount of sweetness required. If the sweetener used is 225 times as sweet as sugar, 1 oz. in 100 lbs. of flour will be as sweet as 14 lbs. sugar.

It is necessary to obtain a licence from the Ministry of Food before manufacture of cake flour can be carried on. The recipe with the necessary instructions on how to use it will require to be submitted to the Ministry when applying for the licence to sell it.

If you require further information, it is suggested that contact is made with an expert, who would work out a recipe for a cake flour and give details how to make cake from it.

Information Supplied

8,318. *Firms supplying potato flour.* (London.)

8,325. *Manufacturers of can openers.* (Cornwall.)

8,330. *Recipes for ginger wine and peppermint soft drink.* (London.)

8,336. *General information about vegetable ivory (Tagua Nut).* (Scotland.)

8,337. *Formulæ for the manufacture of meat extracts, spreads, etc. Also manufacturers of whey products, formula for baking powder.* (London.)

8,350. *Manufacturers of liquid starch.* (London.)

8,351. *Description of the methods employed in the smoking of salmon.* (N. Ireland.)

8,352. *Machine for stoning prunes.* (London.)

Information Required

8,483. *Name of expert in manufacture of corn flakes.* (Norfolk.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

High Vacuum Distillation

This invention has for its object to provide an improved distillation process whereby substances can be distilled under high vacuum conditions and the vapours condensed upon a condensing surface separated from the vaporising zone by substantially unobstructed space and by a distance substantially greater than that heretofore employed.

A process of high vacuum distillation is provided which comprises distilling an organic substance in the form of a thin film from a heated vaporising surface across a substantially unobstructed space, the pressure of the distilland vapour being less than 0·001 mm. Hg. and the distance separating vaporising and condensing surfaces being at least three times as great as the mean free path of the distilling molecules.

In performing distillations under molecular conditions it was discovered that the distance of condensation, or, in other words, the gap between the vaporising and condensing surfaces, was not a critical factor as was originally supposed. It was found, for instance, that carrying out distillation under the same identical conditions, such as pressure, temperature, rate of flow, size of condensing surface, etc., the rate of distillation was substantially the same regardless of whether the vaporising surface was located at a distance from the condensing surface one time the mean free path of the distilling molecules or distances corresponding to many multiples of the mean free path, such as three to twenty times the mean free path. These greater distances represented distillation under conditions wherein the distilling molecules collided with each other numerous times in passing between the two surfaces. Thus it was evident that it is not essential for low-temperature distillation that the molecules shall suffer few or no collisions as was believed to be the case by earlier investigators.

The distilland is heated on the vaporising surface in the form of a thin film as in ordinary molecular distillation. This can be conveniently accomplished by permitting it to flow by gravity down the external wall of a vertical heated column. The temperature at which the column will be heated will, of course, depend upon the particular distilland under consideration and will usually vary from about room temperature to 325°. The temperature of the column should in each case be such as to give a saturation pressure of distilling vapour of between about 10^{-7} mm. Hg. and 0·001 mm. Hg., as in ordinary molecular distillation. Temperatures of between about 90° and 275°, and particularly 120° to 250°, will be found to be best for distilling vitamins from fish oils. Pressures of residual gas of less than about 0·1 mm. Hg. should be employed. Pressures of residual gas in the range of about 0·01 mm. to 0·0001 mm. Hg. will be found to be most generally satisfactory. The pressures defined are measured by a Pirani gauge calibrated against dry air, the gauge tube being situated outside the still and attached by a pipe not less than 0·5 cm. wide introduced into the distilling gap at a point approximately farthest from the point of exhaustion.

The procedure described herein can be employed to distil difficultly volatilisable organic substances. Examples of materials to which the invention can be applied with particular advantage are hydrocarbons and distillates thereof, vegetable and animal oils, fats, waxes, and concentrates thereof, and organic mixtures containing therapeutically active materials. The invention is of particular advantage for separating and purifying hormones, vitamins, enzymes and the like from materials containing them, such as fish oils—for instance, cod, halibut, tuna, sardine, burbot and pollack fish oils; corn, cottonseed and wheat-germ oils; fatty vegetable extracts, etc.

532,770. Distillation Products, Inc.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

546,666. British Arkady Co., Ltd., Ford, W. P., and Egerton, W. E.: Production of baked goods.

546,680. Proctor, J. W.: Machine for breaking up vegetables, roots, greens, and the like.

456,726. Smith, E.: Seed-sowing devices.

547,237. Owen, B. H.: Mounting wheels, pulleys, and the like on fixed shafts.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

SAVORETS.—618,530. Cereal preparations for use in making a batter. **Fopdettia, Ltd.**, 5, Layfield Road, Brunton Park, Newcastle-on-Tyne, 3; Manufacturers.

ALMONDVITEX.—618,870. Confectionery (not medicated) containing almonds. **William Wilson Brown**, 27, Ratcliffe Terrace, Edinburgh; Manufacturers and Merchants.

SOYOMAX.—618,986. Soya flour, and confectionery made of soya flour. **William Wilson Brown**, 27 to 29, Ratcliffe Terrace, Edinburgh, 9; Manufacturer and Merchant. To be Associated with No. 618,984 (3355) xxx and another.

BRYMAC.—619,033. Macaroni, spaghetti, rice, semolina, tapioca, cornflakes, vermicelli, and cereals prepared for food for human consumption. **British Macaroni Products, Ltd.** Cheswardine, Market Drayton, Shropshire; Manufacturers.

NECTIAL.—619,073. Fruit-flavoured non-alcoholic beverages. **Chemos Products, Ltd.**, 14, Slough Lane, London, N.W. 9; Food Product Manufacturers.

New Companies

Stoddart and Hansford, Limited. (375860.) To take over the bus. of a mnfr. of food products cd. on at 7, Islington Green, N. 1, by Wm. Stoddart. Nom. cap.: £15,000 in £1 shares. Dirs.: W. Stoddart, 7, Islington Green, N. 1; N. Stoddart, address not stated. Subs.: F. J. Braybrooks, 54, Old Broad Street, E.C. 2 (acct.); C. W. Boundy, Ibex House, Minories, E.C. 3 (mang. clk.).

Richard J. Pilling, Limited. (375872.) South Street, Bacup, Lancs. To carry on bus. of bakers, confectioners, dlrs. in corn cereals, etc. Nom. cap.: £500 in £1 shares. Dirs.: H. Pinnington, Wynton, Helsby, Ches. (permt.); Miss J. Pinnington, Wynton, Helsby, Ches.; M. Kirk, Bacup; W. R. Pinnington and G. R. Pinnington, addresses not stated.

Lonsdales Bakery, Limited. (375909.) Smithills Bakery, Bolton, Lancs. To take over the bus. cd. on at Smithills Bakery, Bolton. Nom. cap.: £5,000 in £1 shares. Dir.: Ethel M. M. Lonsdale, 60, Church Road, Bolton.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.

SHAPE (AND SIZE!) OF THINGS TO COME

MATES Is this another glimpse of the shape of things to come? Will it become quite usual for husband and wife to work together as Mr. and Mrs. Bourne do at a London factory? He is Manager of the Dispatch department, she is a works inspector on aeronautical work—mates on the job and at home.

FUTURISTIC!

At a steel works in the north of Britain, women steel workers standing by the forge make a picture like a shot from a futuristic film. Safely hooded, slickly overalled, they give us a glimpse of a future when nobody will "wear his old clothes to work." Well-designed, truly functional overalls are already the rule rather than the exception in modern industry. The "Rigmel"-shrinkage treatment has contributed a lot to this general improvement by ensuring that overalls *stay* the shape and size they *start*.

SHIRTS For the last ten years or so, we have heard more about the *colour* of shirts than the shape or size of them! But after this war, we are going to have shirts that *fit*. Shirts that start size 15 and finish size 15. "Rigmel" will see to that! (Hit and Muss don't seem to know about "Rigmel" shrinkage, do they?)

"Rigmel"-Shrunk
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LAUNDRY-TESTED
AGAINST SHRINKAGE

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—Charles Moore & Co. Ltd.

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New Year Resolution

BLACK-OUT CHART FOR JANUARY . . .

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★ *Times shown are those for the London area.*

You will strive more than ever to keep the wheels of output running smoothly and ever faster.

You will see that working conditions lack nothing that will contribute to the comfort and well-being of the workers.

Special care will you take with lighting—that essential and beneficial factor in every industrial plan.

To make sure of reliable lighting service, you will resolve to make 1943 another OSRAM year.

Osram

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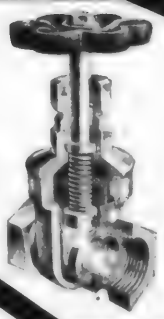

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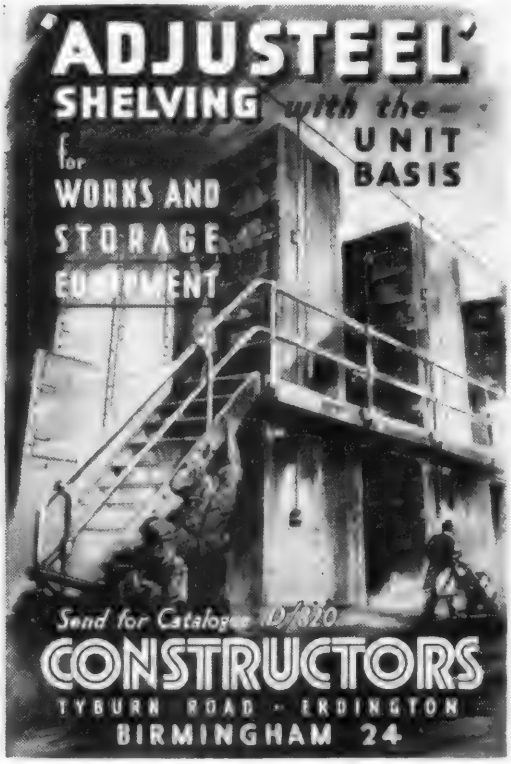

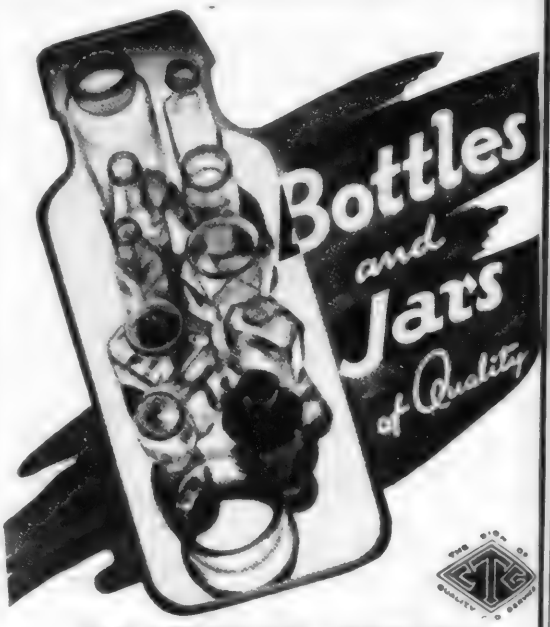

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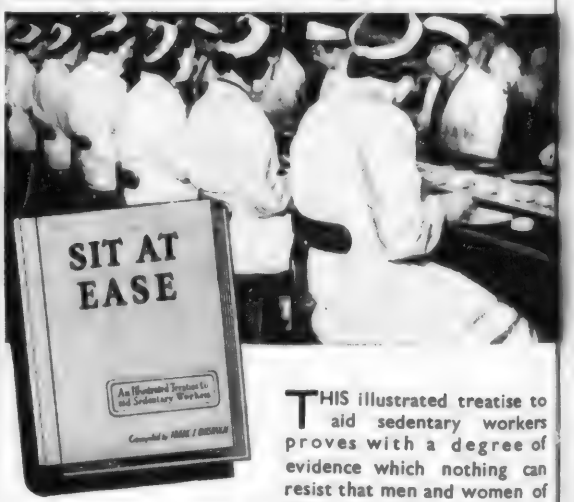

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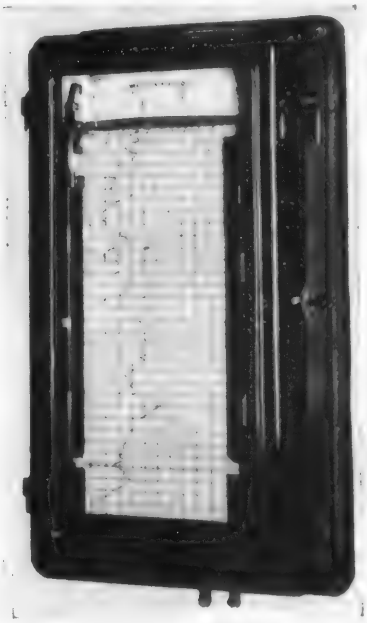

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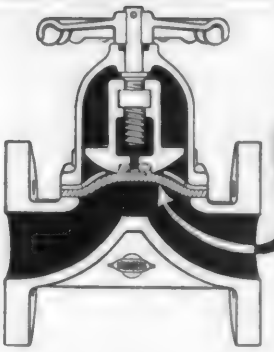

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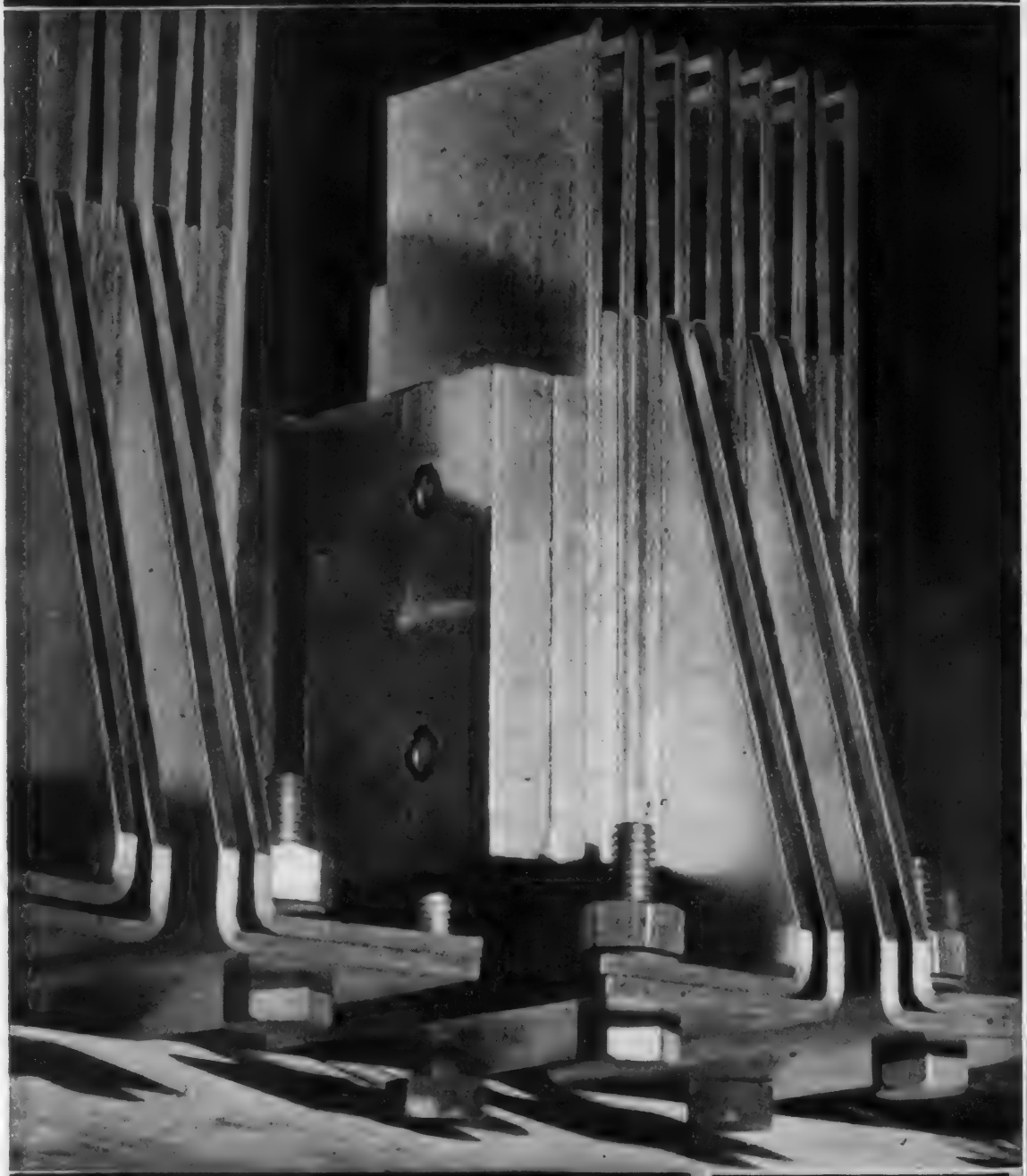

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BOX B501.—The Advertisers wish to thank all those who replied to the advertisement under this number, and to inform them that the matter of the vacant posts has now been dealt with.

CHEMICAL Engineer to act in part-time consultant capacity on processing plants for Food and Chemical Industries for post-war production. Midland area. Eventual full-time position.—Write in complete confidence giving details of experience, etc., Box B543, *Food Manufacture*, 17, Stratford Place, London, W1.

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MAN or woman wanted with thorough knowledge of the pickle trade and able to take complete control of department.—Box B539, *Food Manufacture*, 17, Stratford Place, London, W.1.

FOODSTUFFS Chemist wanted for London. Only man with wide experience should apply.—Box B529, *Food Manufacture*, 17, Stratford Place, London, W.1.

FOOD Chemist, experienced in Dairy Food Processing and in Bacteriology. First-class opportunity for young man with the necessary qualifications, and possessing initiative and ambition.—Please reply fully, in confidence, to Box B462, *Food Manufacture*, 17, Stratford Place, London, W.1.

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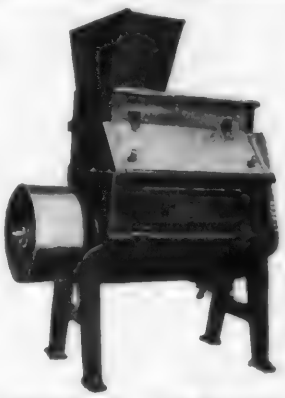

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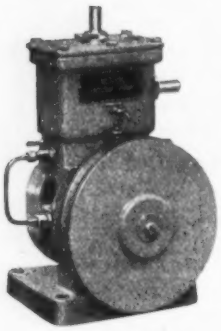

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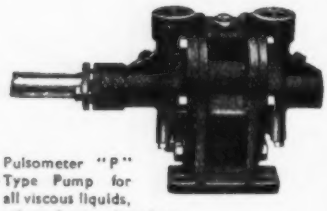

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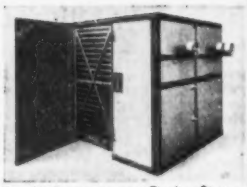

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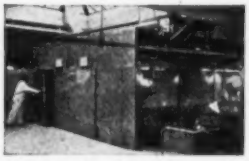

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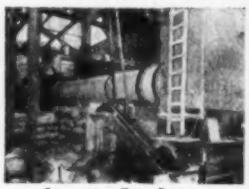

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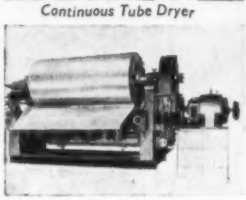

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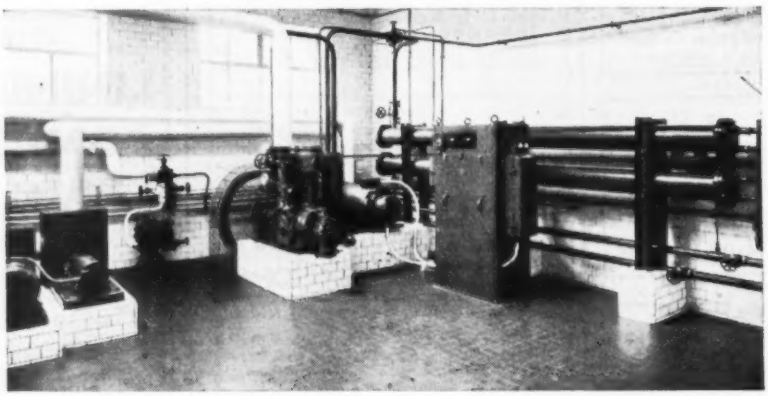

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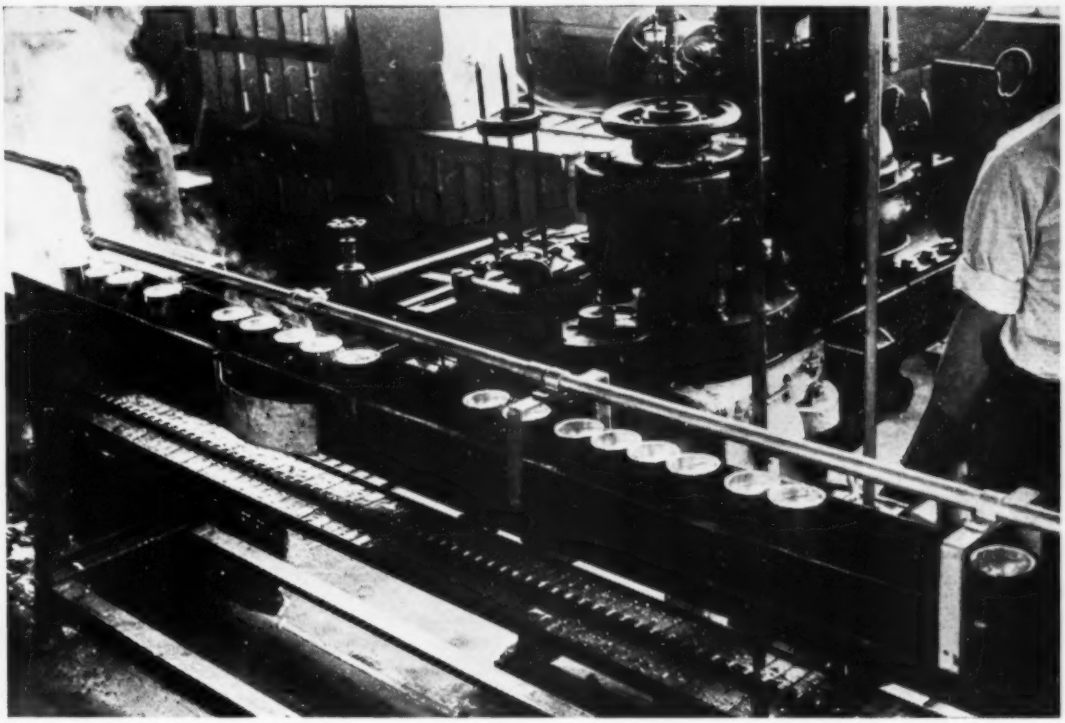

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